On some equations concerning the planar curves under the Euclidean and affine groups. Possible mathematical connections with some sectors of String Theory

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Abstract

In this research thesis, we describe some equations concerning the planar curves under the Euclidean and affine groups. We describe also the possible mathematical connections with some sectors of String Theory

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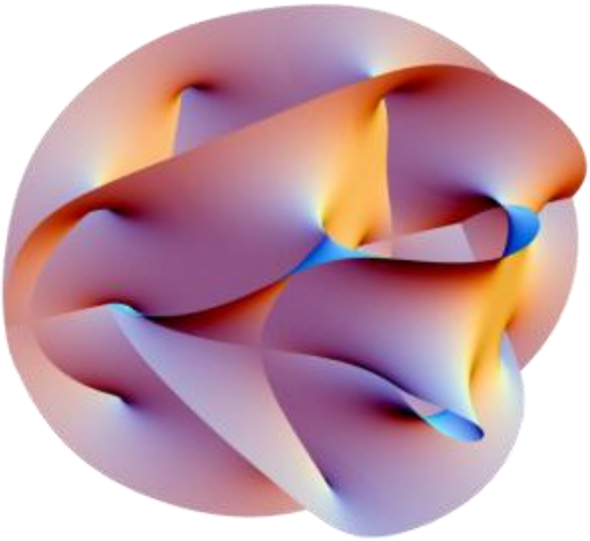

Calabi-Yau Manifold

https://www.livescience.com/18047-universe-ten-dimensions.html

We have, with regard the Universe epoch:

	Time	Radiation temperature (Energy)
Planck epoch	$<10^{-43}$ s	$>10^{32}$ K

And:

Planck's Area $= 2.612280 \times 10^{-70}\ \mathrm{m}^2$

$$l_P^2 = \frac{\hbar G}{c^3}$$

From:

Differential and Numerically Invariant Signature Curves Applied to Object Recognition – *Eugenio Calabi, P. J. Oliver et al.* – May 1, 1996

Differential and Numerically Invariant Signature Curves Applied to Object Recognition

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We have that:

Theorem 3.4. *The affine curvature of a nondegenerate conic C defined by the quadratic equation*

$$Ax^2 + 2Bxy + Cy^2 + 2Dx + 2Ey + F = 0 \tag{3.7}$$

is given by

$$\kappa = \frac{S}{T^{2/3}}, \tag{3.8}$$

In particular, the equi-affine curvature of an ellipse in the plane is given by

$$\kappa = \left(\frac{\pi}{\mathbf{A}}\right)^{2/3}, \qquad \text{where} \qquad \mathbf{A} = \frac{\pi}{\kappa^{3/2}} = -\pi\,\frac{T}{S^{3/2}} \tag{3.10}$$

is the area of the ellipse.

In particular, using equations (3.8), (3.10), we see that the *total* affine arc length $\mathbf{L}$ of an ellipse equals a multiple of the cube root of its *total* area $\mathbf{A}$,

$$\mathbf{L} = 2\kappa\mathbf{A} = \sqrt[3]{8\pi^2\mathbf{A}} = \frac{2\pi}{\sqrt{\kappa}} = -2\pi\,\frac{T^{1/3}}{S^{1/2}}, \qquad (3.23)$$

$$\kappa = \left(\frac{\pi}{\mathbf{A}}\right)^{2/3} \qquad L(\widetilde{P},\widetilde{Q}) = 2\,\frac{\lambda^{5/3}}{\mu^{4/3}}\,\widehat{\mathbf{A}} = 2\,\frac{\lambda^{2/3}}{\mu^{4/3}}\,\mathbf{A} = 2\kappa\mathbf{A},$$

$$\mathbf{L} = 2\kappa\mathbf{A} = \sqrt[3]{8\pi^2\mathbf{A}} = \frac{2\pi}{\sqrt{\kappa}} = -2\pi\,\frac{T^{1/3}}{S^{1/2}},$$

From:

$$\sqrt[3]{8\pi^2\mathbf{A}} = \frac{2\pi}{\sqrt{\kappa}}$$

We obtain:

(8Pi^2*2.612280 × 10^-70)^(1/3) = 2Pi/(sqrt(Pi/2.612280 × 10^-70)^(2/3))

Input interpretation:

$$\sqrt[3]{8\pi^2 \times 2.612280 \times 10^{-70}} = 2 \times \frac{\pi}{\sqrt{\frac{\pi}{2.612280 \times 10^{-70}}}^{2/3}}$$

Result:

True

(8Pi^2*2.612280 × 10^-70)^(1/3)

Input interpretation:

$$\sqrt[3]{8\pi^2 \times 2.612280 \times 10^{-70}}$$

Result:

$2.742436\ldots \times 10^{-23}$

$2.742436\ldots * 10^{-23}$

2Pi/(sqrt(Pi/2.612280 × 10^-70)^(2/3))

Input interpretation:

$$2\times\frac{\pi}{\sqrt{\frac{\pi}{2.612280\times10^{-70}}}^{2/3}}$$

Result:

$2.742436\ldots\times10^{-23}$

$2.742436\ldots*10^{-23}$

From:

$$\frac{2\pi}{\sqrt{\kappa}}=-2\pi\,\frac{T^{1/3}}{S^{1/2}}$$

2Pi/(sqrt(Pi/2.612280 × 10^-70)^(2/3)) = -2Pi * (x^(1/3)) / (y^(1/2))

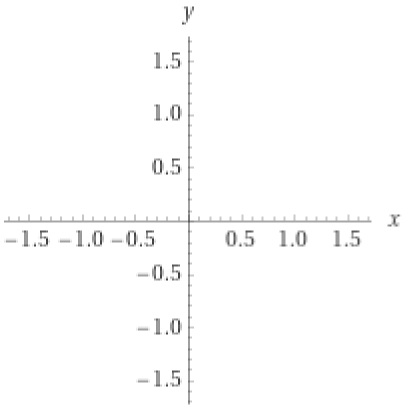
Input interpretation:

$$\frac{2\pi}{\sqrt{\frac{\pi}{2.612280\times10^{-70}}}^{2/3}}=-2\pi\times\frac{\sqrt[3]{x}}{\sqrt{y}}$$

Result:

$$2.74244\times10^{-23}=-\frac{2\pi\sqrt[3]{x}}{\sqrt{y}}$$

Implicit plot:



Solution for the variable y:

$$y = 52\,491\,231\,857\,455\,146\,771\,278\,005\,877\,276\,724\,829\,439\,918\,080\, x^{2/3}$$

Implicit derivatives:

$$\frac{\partial x(y)}{\partial y} = (3\, y^2) / (300\,878\,429\,871\,763\,201\,882\,434\,267\,260\,143\,454\,083\,500\,817\,715\,854\,426\,542\,088\,083\,478\,890\,978\,546\,311\,830\,082\,439\,616\,705\,676\,224\,575\,424\,265\,932\,072\,266\,541\,908\,577\,531\,250\,000\,000\, \pi^6\, x)$$

$$\frac{\partial y(x)}{\partial x} = \frac{1}{3\, y^2}\, 300\,878\,429\,871\,763\,201\,882\,434\,267\,260\,143\,454\,083\,500\,817\,715\,854\,426\,542\,088\,083\,478\,890\,978\,546\,311\,830\,082\,439\,616\,705\,676\,224\,575\,424\,265\,932\,072\,266\,541\,908\,577\,531\,250\,000\,000\, \pi^6\, x$$

x = √2

(-2Pi)* ((sqrt2)^(1/3)) / (((52491231857455146771278005877276724829439918080 (sqrt2)^(2/3))^(1/2))) = -2.74243590313188333320909147281683909868592857515230109263× 10^-23

Input interpretation:

$$(-2\pi)\times\frac{\sqrt[3]{\sqrt{2}}}{\sqrt{52\,491\,231\,857\,455\,146\,771\,278\,005\,877\,276\,724\,829\,439\,918\,080\,\sqrt{2}^{2/3}}} = -2.74243590313188333320909147281683909868592857515230109263\times10^{-23}$$

Result:

True

(-2Pi)* ((sqrt2)^(1/3)) / (((52491231857455146771278005877276724829439918080 (sqrt2)^(2/3))^(1/2)))

Input:

$$(-2\pi)\times\frac{\sqrt[3]{\sqrt{2}}}{\sqrt{52\,491\,231\,857\,455\,146\,771\,278\,005\,877\,276\,724\,829\,439\,918\,080\,\sqrt{2}^{2/3}}}$$

Result:

$$-\frac{\pi}{4\,503\,599\,627\,370\,496\,\sqrt{647\,004\,385\,613\,095}}$$

Decimal approximation:

$-2.74243590313188333320909147281683909868592857515230109263\ldots\times10^{-23}$

-2.7424359031…*10^{-23}

Property:

$$-\frac{\pi}{4\,503\,599\,627\,370\,496\,\sqrt{647\,004\,385\,613\,095}}$$ is a transcendental number

2Pi/(sqrt(Pi/2.612280 × 10^-70)^(2/3)) = -2Pi * ((sqrt2)^(1/3)) / (y^(1/2))

Input interpretation:

$$2\times\frac{\pi}{\sqrt{\frac{\pi}{2.612280\times10^{-70}}}^{2/3}} = -2\,\pi\times\frac{\sqrt[3]{\sqrt{2}}}{\sqrt{y}}$$

Result:

$$2.74244\times10^{-23} = -\frac{2\sqrt[6]{2}\,\pi}{\sqrt{y}}$$

Alternate form assuming y is real:

$$\frac{3.52632}{\sqrt{y}} + 1.37122\times10^{-23} = 0$$

Alternate form:

$$\sqrt{y} = -2.57167\times10^{23}$$

Indeed:

-2Pi * ((sqrt2)^(1/3)) / ((-2.57167×10^23))

Input interpretation:

$$-2\,\pi\left(-\frac{\sqrt[3]{\sqrt{2}}}{2.57167\times10^{23}}\right)$$

Result:

$2.74243\ldots\times10^{-23}$

$2.74243\ldots*10^{-23}$

$T^{1/3}$ = (sqrt2)^(1/3) ; $S^{1/2}$ = -2.57167 * 10^{23}

-2Pi * ((x)) / ((-2.57167×10^23)) = 2.74243e-23

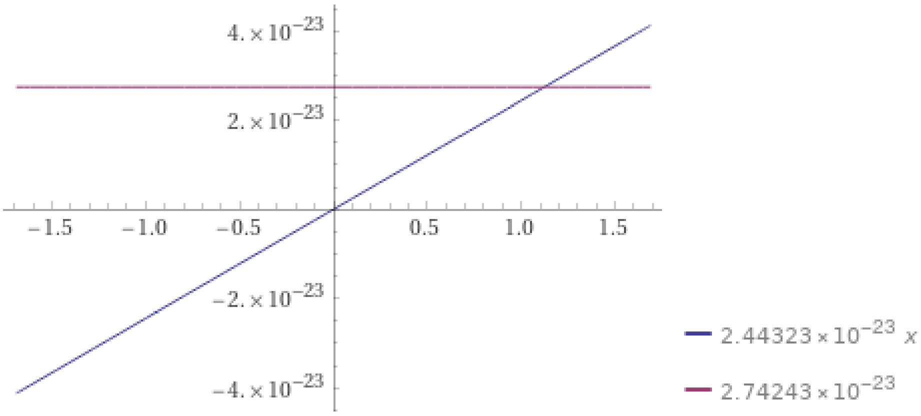
Input interpretation:

$$-2\pi\left(-\frac{x}{2.57167\times 10^{23}}\right) = 2.74243\times 10^{-23}$$

Result:

$$2.44323\times 10^{-23}\,x = 2.74243\times 10^{-23}$$

Plot:



Alternate form:

$$2.44323\times 10^{-23}\,x - 2.74243\times 10^{-23} = 0$$

Alternate form assuming x is real:

$$2.44323\times 10^{-23}\,x + 0 = 2.74243\times 10^{-23}$$

Solution:

$$x \approx 1.12246$$

1.12246

Thence:

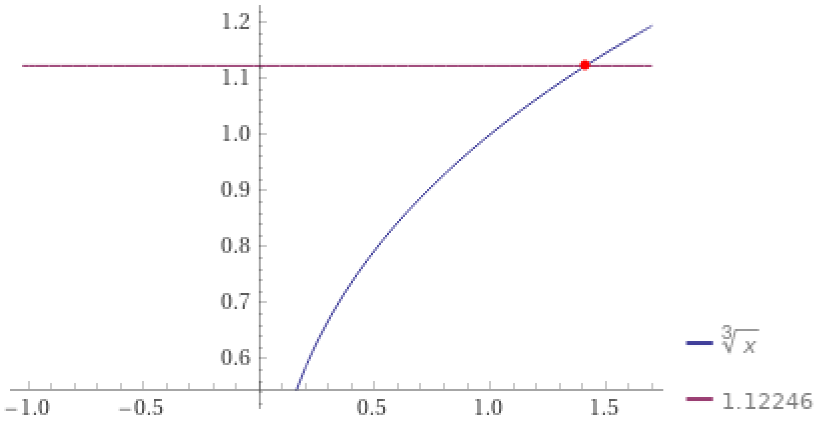
$T^{1/3}$ = 1.12246 ; $S^{1/2}$ = -2.57167 * 10^{23}

x^(1/3) = 1.12246

Input interpretation:
$\sqrt[3]{x} = 1.12246$

Result:
$\sqrt[3]{x} = 1.12246$

Plot: **(figure that can be related to an open string)**



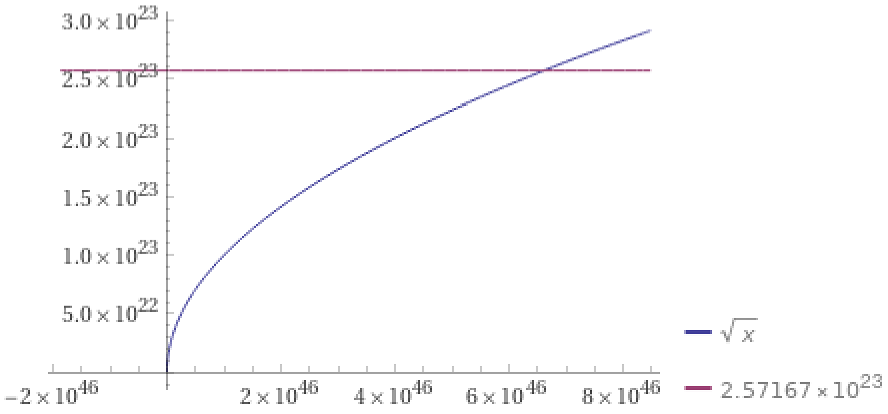
Solution:
$x = 1.41421$
T = 1.41421 = √2

x^(1/2) = (2.57167 * 10^23)

Input interpretation:
$\sqrt{x} = 2.57167 \times 10^{23}$

Result:
$\sqrt{x} = 2.57167 \times 10^{23}$

Plot: **(figure that can be related to an open string)**



Solution:

$x = 66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752$

Scientific notation:

$6.6134865888999995365735063181486743575962058752 \times 10^{46}$

$S = 6.61348658\ldots{*}10^{46}$

(sqrt2)/(66134865888999995365735063181486743575962058752)

Input:

$$\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}$$

Exact result:

$$\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\,\sqrt{2}}$$

Decimal approximation:

$2.1383782114969356143571817747623271404112027205927779983655\ldots \times 10^{-47}$

$2.138378211\ldots{*}10^{-47}$

Alternate form:

$$\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}$$

16* -ln[sqrt2 / (66134865888999995365735063181486743575962058752)]+Pi^2

Input:

$$16\times(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2$$

$\log(x)$ is the natural logarithm

Exact result:

$$\pi^2-16\log\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\,\sqrt{2}}\right)$$

Decimal approximation:

1729.2528311865459595439439259384600210599161641355480952557110859
...

1729.252831186…

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

Alternate forms:

$$\pi^2+1704\log(2)+16\log(407\,587\,579\,467\,709)$$

$$\pi^2+8\,(\log(2)+2\log(33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376))$$

$$\pi^2-16\left(-\frac{\log(2)}{2}-\log(33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376)\right)$$

$$\pi^2 - 16\left(-\frac{213\log(2)}{2} - \log(2251) - \log(181\,069\,559\,959)\right)$$

Alternative representations:

$$16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2 = -16\log_e\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2$$

$$16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2 = -16\log(a)\log_a\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2$$

$$16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2 = 16\,\mathrm{Li}_1\left(1 - \frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2$$

Series representations:

$$16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2 = \pi^2 + 16\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1 + \frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}\right)^k}{k}$$

$$16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2 = \pi^2 - 32\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}-x\right)}{2\pi}\right\rfloor - 16\log(x) + 16\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}-x\right)^k x^{-k}}{k} \quad \text{for } x<0$$

$$16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2 = \pi^2 - 32\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor - 16\log(z_0) + 16\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}-z_0\right)^k z_0^{-k}}{k}$$

Integral representation:

$$16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2 = \pi^2 - 16\int_1^{\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}}\frac{1}{t}\,dt$$

[16* -ln[sqrt2/(66134865888999995365735063181486743575962058752)]+Pi^2]^1/15

Input:

$$\left(16\times(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2\right)^\wedge(1/15)$$

log(x) is the natural logarithm

Exact result:

$$\left(\pi^2 - 16\log\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}\right)\right)\text{^}(1/15)$$

Decimal approximation:

1.6438312526313625331009092806504482774213532576444693903734356918...

$1.643831252.... \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 ...$

Alternate forms:

$$\sqrt[15]{\pi^2 + 1704\log(2) + 16\log(407\,587\,579\,467\,709)}$$

$$(\pi^2 + 8(\log(2) + 2\log(33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376)))\text{^}(1/15)$$

$$\sqrt[15]{\pi^2 + 8(213\log(2) + 2\log(407\,587\,579\,467\,709))}$$

$$\sqrt[15]{\pi^2 - 16\left(-\frac{213\log(2)}{2} - \log(2251) - \log(181\,069\,559\,959)\right)}$$

All 15th roots of π^2 - 16 log(1/(33067432944499997682867531590743371787981029376 sqrt(2))):

$$e^{0}\left(\pi^2 - 16\log\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\,\sqrt{2}}\right)\right)^\wedge(1/15) \approx 1.64383$$ (real, principal root)

$$e^{(2 i \pi)/15}\left(\pi^2 - 16\log\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\,\sqrt{2}}\right)\right)^\wedge(1/15) \approx 1.50171 + 0.6686\, i$$

$$e^{(4 i \pi)/15}\left(\pi^2 - 16\log\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\,\sqrt{2}}\right)\right)^\wedge(1/15) \approx 1.0999 + 1.2216\, i$$

$$e^{(2 i \pi)/5}\left(\pi^2 - 16\log\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\,\sqrt{2}}\right)\right)^\wedge(1/15) \approx 0.5080 + 1.5634\, i$$

$$e^{(8 i \pi)/15} \left(\pi^2 - 16 \log\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376 \sqrt{2}}\right)\right) \text{^} (1/15) \approx -0.17183 + 1.63483 i$$

Alternative representations:

$$\left(16 (-1) \log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2\right) \text{^} (1/15) = \left(-16 \log_e\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2\right) \text{^} (1/15)$$

$$\left(16 (-1) \log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2\right) \text{^} (1/15) = \left(-16 \log(a) \log_a\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right) + \pi^2\right) \text{^} (1/15)$$

$$\left(16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2\right)\wedge(1/15)=$$

$$\left(16\,\mathrm{Li}_1\left(1-\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2\right)\wedge(1/15)$$

Series representations:

$$\left(16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2\right)\wedge(1/15)=$$

$$\sqrt[15]{\pi^2+16\sum_{k=1}^{\infty}\frac{(-1)^k\left(-1+\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}\right)^k}{k}}$$

$$\left(16(-1)\log\left(\frac{\sqrt{2}}{66\,134\,865\,888\,999\,995\,365\,735\,063\,181\,486\,743\,575\,962\,058\,752}\right)+\pi^2\right)\wedge(1/15)=$$

$$\left(\pi^2-16\left(2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{1}{33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}}-x\right)}{2\,\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(1/\left(33\,067\,432\,944\,499\,997\,682\,867\,531\,590\,743\,371\,787\,981\,029\,376\sqrt{2}\right)-x\right)^k x^{-k}\right)\right)\wedge(1/15)\quad\text{for } x<0$$

$$\left(16(-1)\log\left(\frac{\sqrt{2}}{66134865888999995365735063181486743575962058752}\right)+\pi^2\right)\hat{}\,(1/15)=$$

$$\left(\pi^2-16\left(2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{1}{k}(-1)^k\left(1/\left(33067432944499997682867531590743371787981029376\sqrt{2}\right)-z_0\right)^k z_0^{-k}\right)\right)\hat{}\,(1/15)$$

Integral representation:

$$\left(16(-1)\log\left(\frac{\sqrt{2}}{66134865888999995365735063181486743575962058752}\right)+\pi^2\right)\hat{}\,(1/15)=$$

$$\sqrt[15]{\pi^2-16\int_1^{\frac{1}{33067432944499997682867531590743371787981029376\sqrt{2}}}\frac{1}{t}\,dt}$$

(π^2 - 16 integral_1^(1/(3.306743294449e+46 sqrt(2))) 1/t dt)^(1/15)

Input interpretation:

$$\sqrt[15]{\pi^2-16\int_1^{\frac{1}{3.306743294449\times10^{46}\sqrt{2}}}\frac{1}{t}\,dt}$$

Result:

1.6438312526313

$1.6438312526313 \approx \zeta(2) = \frac{\pi^2}{6} = 1.644934 \ldots$

Computation result:

$$\sqrt[15]{\pi^2 - 16 \int_1^{\frac{1}{3.306743294449\times 10^{46}\sqrt{2}}} \frac{1}{t}\, dt} = 1.64958$$

2[1/27*((((π^2 - 16 integral_1^(1/(3.306743294449e+46 sqrt(2))) 1/t dt))))]^2-11-(ζ(3)/4 + ζ(5) - (11 π^2)/96 + π^4/144)

Input interpretation:

$$2\left(\frac{1}{27}\left(\pi^2 - 16 \int_1^{\frac{1}{3.306743294449\times 10^{46}\sqrt{2}}} \frac{1}{t}\, dt\right)\right)^2 - 11 - \left(\frac{\zeta(3)}{4} + \zeta(5) - \frac{1}{96}\left(11\,\pi^2\right) + \frac{\pi^4}{144}\right)$$

$\zeta(s)$ is the Riemann zeta function

Result:

8191.99999999

8191.9999… ≈ 8192

The total amplitude vanishes for gauge group SO(8192), while the vacuum energy is negative and independent of the gauge group.

The vacuum energy and dilaton tadpole to lowest non-trivial order for the open bosonic string. While the vacuum energy is non-zero and independent of the gauge group, the dilaton tadpole is zero for a unique choice of gauge group, SO(2^{13}) i.e. SO(8192). (From: "Dilaton Tadpole for the Open Bosonic String " Michael R. Douglas and Benjamin Grinstein - September 2,1986)

From:

$$\kappa = -\frac{(m-2)(2m-1)}{9m^{2/3}(m-1)^{2/3}a^{2/3}}\, x^{-2(m+1)/3} + \cdots,$$
$$\kappa_s = \frac{(m-2)(2m-1)(2m+2)}{27m(m-1)a}\, x^{-(m+1)} + \cdots, \qquad (3.30)$$

give the leading order asymptotics of the signature invariants. Thus as we approach the inflection point, $x \to 0$ and the signature curve tends to ∞ along the asymptotic curve

$$\kappa_s = \pm C_m |\kappa|^{3/2} + \cdots, \qquad \text{where} \qquad C_m = \frac{2m+2}{\sqrt{(m-2)(2m-1)}}. \qquad (3.31)$$

For m = 3, a = 2 and x = 5, we obtain:

(2*3+2)/(sqrt((3-2)(2*3-1))) * [((3-2)(2*3-1))/((9*3^(2/3)(3-1)^(2/3)*2^(2/3)))*5^(-2(3+1)/3)]^(3/2)

Input:

$$\frac{2\times 3+2}{\sqrt{(3-2)(2\times 3-1)}}\left(\frac{(3-2)(2\times 3-1)}{9\times 3^{2/3}\left((3-1)^{2/3}\times 2^{2/3}\right)}\times 5^{-2\times(3+1)/3}\right)^{3/2}$$

Exact result:

$$\frac{2}{10\,125}$$

Decimal approximation:

0.000197530864197530864197530864

Exact result:

$$\frac{2}{10\,125}$$

Decimal approximation:

0.000197530864197530864197530864

Decimal form:

5062.5

5062.5

1/((((2*3+2)/(sqrt((3-2)(2*3-1))) * [((3-2)(2*3-1))1/((9*3^(2/3)(3-1)^(2/3)*2^(2/3)))*5^(-2(3+1)/3)]^(3/2))))+1/[((3-2)(2*3-1)(2*3+2)) 1/ ((27*3(3-1)*2)) * 5^(-(3+1))]

Input:

$$\frac{1}{\frac{2\times 3+2}{\sqrt{(3-2)(2\times 3-1)}}\left(((3-2)(2\times 3-1))\times \frac{1}{9\times 3^{2/3}\left((3-1)^{2/3}\times 2^{2/3}\right)}\times 5^{-2\times(3+1)/3}\right)^{3/2}}+\frac{1}{((3-2)(2\times 3-1)(2\times 3+2))\times \frac{1}{27\times 3\,((3-1)\times 2)}\times 5^{-(3+1)}}$$

Exact result:

10125

10125

1/((((2*3+2)/(sqrt((3-2)(2*3-1))) * [((3-2)(2*3-1))1/((9*3^(2/3)(3-1)^(2/3)*2^(2/3)))*5^(-2(3+1)/3)]^(3/2))))+1/[((3-2)(2*3-1)(2*3+2)) 1/ ((27*3(3-1)*2)) * 5^(-(3+1))]+18

Input:

$$\frac{1}{\frac{2\times 3+2}{\sqrt{(3-2)(2\times 3-1)}}\left(((3-2)(2\times 3-1))\times \frac{1}{9\times 3^{2/3}\left((3-1)^{2/3}\times 2^{2/3}\right)}\times 5^{-2\times(3+1)/3}\right)^{3/2}}+\frac{1}{((3-2)(2\times 3-1)(2\times 3+2))\times \frac{1}{27\times 3\,((3-1)\times 2)}\times 5^{-(3+1)}}+18$$

Exact result:

10143

10143 result that is equal to p(33), i.e. the partition number of 33

27/2[((((1/((((2*3+2)/(sqrt((3-2)(2*3-1))) * [((3-2)(2*3-1))1/((9*3^(2/3)(3-1)^(2/3)*2^(2/3)))*5^(-2(3+1)/3)]^(3/2)))) + 1/[((3-2)(2*3-1)(2*3+2)) 1/ ((27*3(3-1)*2)) * 5^(-(3+1))]))/81))+3]

Input:

$$\frac{27}{2}\left(\frac{1}{81}\left(\frac{1}{\frac{2\times3+2}{\sqrt{(3-2)(2\times3-1)}}\left(((3-2)(2\times3-1))\times\frac{1}{9\times3^{2/3}\left((3-1)^{2/3}\times2^{2/3}\right)}\times5^{-2\times(3+1)/3}\right)^{3/2}}+\frac{1}{((3-2)(2\times3-1)(2\times3+2))\times\frac{1}{27\times3((3-1)\times2)}\times5^{-(3+1)}}\right)+3\right)$$

Exact result:

1728

1728

This result is very near to the mass of candidate glueball **f_0(1710) scalar meson.** Furthermore, 1728 occurs in the algebraic formula for the j-invariant of an elliptic curve. The number 1728 is one less than the Hardy–Ramanujan number 1729 (taxicab number)

((27/2[((((1/((((8)/(sqrt((5))) * [((5))1/((9*3^(2/3)(3-1)^(2/3)*2^(2/3)))*5^(-2(3+1)/3)]^(3/2)))) + 1/[((5)(8)) 1/ ((27*3(3-1)*2)) * 5^(-(3+1))]))/81))+3]))^1/15

Input:

$$\left(\frac{27}{2}\left(\frac{1}{81}\left(\frac{1}{\frac{8}{\sqrt{5}}\left(5\times\frac{1}{9\times3^{2/3}\left((3-1)^{2/3}\times2^{2/3}\right)}\times5^{-2\times(3+1)/3}\right)^{3/2}}+\frac{1}{(5\times8)\times\frac{1}{27\times3((3-1)\times2)}\times5^{-(3+1)}}\right)+3\right)\right)\hat{}\,(1/15)$$

Result:

$2^{2/5}\sqrt[5]{3}$

Decimal approximation:

1.6437518295172257623084979362309795173834925899454752004110297675...

1.64375182951.... ≈ $\zeta(2) = \frac{\pi^2}{6} = 1.644934$ ...

From the previous formula, we obtain also:

[1/((((2*3+2)/(sqrt((3-2)(2*3-1))) * [((3-2)(2*3-1))1/((9*3^(2/3)(3-1)^(2/3)*2^(2/3)))*5^(-2(3+1)/3)]^(3/2))))]^1/17

Input:

$$\sqrt[17]{\frac{1}{\frac{2\times 3+2}{\sqrt{(3-2)(2\times 3-1)}}\left(((3-2)(2\times 3-1))\times \frac{1}{9\times 3^{2/3}\left((3-1)^{2/3}\times 2^{2/3}\right)}\times 5^{-2\times(3+1)/3}\right)^{3/2}}}$$

Result:

$$\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}$$

Decimal approximation:

1.6515960124505799836511022389337072813234969833287423983018170242...

1.65159601245.... result very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

Alternate form:

root of $2x^{17} - 10125$ near $x = 1.6516$

And:

((1/[((3-2)(2*3-1)(2*3+2)) 1/ ((27*3(3-1)*2)) * 5^(-(3+1))]))^1/18

Input:

$$\sqrt[18]{\frac{1}{((3-2)(2\times 3-1)(2\times 3+2))\times \frac{1}{27\times 3\,((3-1)\times 2)}\times 5^{-(3+1)}}}$$

Result:

$$\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}$$

Decimal approximation:

1.606194215683981460762036373210899715319044404935406333680350618...

1.606194215….

Alternate form:

root of $2x^{18}-10125$ near $x=1.60619$

From which:

1/3 sqrt(-3 + π + log(8))((((3^(4/17) 5^(3/17))/2^(1/17) + (3^(2/9) 5^(1/6))/2^(1/18))))

Input:

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)$$

log(x) is the natural logarithm

Exact result:

$$\frac{1}{3}\left(\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}+\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}\right)\sqrt{-3+\pi+\log(8)}$$

Decimal approximation:

1.6183762039252618626134785905055365498930663018273961685526339425

...

1.6183762039…. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Alternate forms:

$$\frac{1}{6}\left(2^{17/18}\times 3^{2/9}\sqrt[6]{5}+2^{16/17}\times 3^{4/17}\times 5^{3/17}\right)\sqrt{-3+\pi+\log(8)}$$

$$\frac{\sqrt[6]{5}\left(\sqrt[306]{2}+3^{2/153}\sqrt[102]{5}\right)\sqrt{\pi+3(\log(2)-1)}}{\sqrt[17]{2}\ 3^{7/9}}$$

$$\frac{\sqrt[6]{5}\sqrt{-3+\pi+3\log(2)}}{\sqrt[18]{2}\ 3^{7/9}}+\frac{5^{3/17}\sqrt{-3+\pi+3\log(2)}}{\sqrt[17]{2}\ 3^{13/17}}$$

Expanded form:

$$\frac{\sqrt[6]{5}\sqrt{-3+\pi+\log(8)}}{\sqrt[18]{2}\ 3^{7/9}}+\frac{5^{3/17}\sqrt{-3+\pi+\log(8)}}{\sqrt[17]{2}\ 3^{13/17}}$$

Alternative representations:

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=\frac{1}{3}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)\sqrt{-3+\pi+\log_e(8)}$$

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=$$
$$\frac{1}{3}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)\sqrt{-3+\pi+\log(a)\log_a(8)}$$

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=$$
$$\frac{1}{3}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)\sqrt{-3+\pi-\text{Li}_1(-7)}$$

Series representations:

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=$$
$$\frac{\sqrt[6]{5}\left(\sqrt[306]{2}+3^{2/153}\sqrt[102]{5}\right)\sqrt{-3+\pi+\log(7)-\sum_{k=1}^{\infty}\frac{\left(-\frac{1}{7}\right)^k}{k}}}{\sqrt[17]{2}\;3^{7/9}}$$

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=$$
$$\frac{1}{6}\left(2^{17/18}\times 3^{2/9}\sqrt[6]{5}+2^{16/17}\times 3^{4/17}\times 5^{3/17}\right)$$
$$\sqrt{-3+\pi+2\,i\,\pi\left\lfloor\frac{\arg(8-x)}{2\,\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(8-x)^k\,x^{-k}}{k}}\quad\text{for } x<0$$

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=\frac{1}{3}\left(\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}+\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}\right)$$
$$\sqrt{-3+\pi+2\,i\,\pi\left\lfloor\frac{\arg(8-x)}{2\,\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\,(8-x)^k\,x^{-k}}{k}}\quad\text{for } x<0$$

Integral representations:

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=$$
$$\frac{\sqrt[6]{5}\left(\sqrt[306]{2}+3^{2/153}\sqrt[102]{5}\right)\sqrt{-3+\pi+\int_1^8 \frac{1}{t}\,dt}}{\sqrt[17]{2}\;3^{7/9}}$$

$$\frac{1}{3}\sqrt{-3+\pi+\log(8)}\left(\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}+\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}\right)=\frac{1}{3}\left(\frac{3^{2/9}\sqrt[6]{5}}{\sqrt[18]{2}}+\frac{3^{4/17}\times 5^{3/17}}{\sqrt[17]{2}}\right)$$
$$\sqrt{-3+\pi-\frac{i}{2\pi}\int_{-i\infty+\gamma}^{i\infty+\gamma}\frac{7^{-s}\,\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds} \quad \text{for } -1<\gamma<0$$

From:

[((3-2)(2*3-1))/((9*3^(2/3)(3-1)^(2/3)*2^(2/3)))*5^(-2(3+1)/3)]

Input:

$$\frac{(3-2)(2\times 3-1)}{9\times 3^{2/3}\left((3-1)^{2/3}\times 2^{2/3}\right)}\times 5^{-2\times(3+1)/3}$$

Result:

$$\frac{1}{90\sqrt[3]{2}\;15^{2/3}}$$

Decimal approximation:

0.001449950978210690220527754096448767194419141560869415895428125 2…

0.001449950978…

Alternate form:

$$\frac{2^{2/3}\sqrt[3]{15}}{2700}$$

And

$$\frac{(3-2)(2\times 3-1)(2\times 3+2)}{27\times 3((3-1)\times 2)}\times 5^{-(3+1)}$$

Decimal approximation:

0.000197530864197530864197530864197530864197530864197530864197530864197530 8…

0.000197530864…

From:

$$\begin{aligned} c &= \sqrt{(k-h)^2+[u(k)-u(h)]^2} \\ &= (k-h)\left[1+\tfrac{1}{8}u_2^2(h+k)^2+\tfrac{1}{12}u_2u_3(h+k)(h^2+hk+k^2)+\cdots\right] \qquad (A.2) \\ &= (a+b)\left[1-\tfrac{1}{8}\kappa^2ab+\tfrac{1}{12}\kappa\kappa_s ab(a-b)-\left\{\tfrac{1}{48}\kappa\kappa_{ss}+\tfrac{1}{128}\kappa^4\right\}ab(a^2-ab+b^2)+\cdots\right]. \end{aligned}$$

$$(a+b)\left[1-\tfrac{1}{8}\kappa^2ab+\tfrac{1}{12}\kappa\kappa_s ab(a-b)-\left\{\tfrac{1}{48}\kappa\kappa_{ss}+\tfrac{1}{128}\kappa^4\right\}ab(a^2-ab+b^2)+\cdots\right]$$

For a = 2, b = 3 , κ = 0.0014499509782106902 2 κ_s = 0.000197530864197 53

5[1-1/8*0.00144995097821069022^2*6+1/12*0.00144995097821069022*
0.00019753086419753*6(2-3)-(1/48*0.00144995097821069022*
0.00019753086419753+1/128*0.00144995097821069022^4)*6(4-6+9)]

Input interpretation:

$$5\left(1-\frac{1}{8}\times 0.00144995097821069022^2\times 6+\frac{1}{12}\times 0.00144995097821069022\times 0.00019753086419753\times 6(2-3)-\left(\frac{1}{48}\times 0.00144995097821069022\times 0.00019753086419753+\frac{1}{128}\times 0.00144995097821069022^4\right)\times 6(4-6+9)\right)$$

Result:

4.999990147081621865797815070263359870331234418634783734213828755 5...

4.99999014708162… ≈ 5 (Fibonacci number)

8/(((5[1-1/8*0.0014499509782106902 2^2*6+1/12*0.0014499509782106902 2*0.00019753086419753*6(2-3)-(1/48*0.0014499509782106902 2*0.00019753086419753+1/128*0.0014499509782106902 2^4)*6(4-6+9)])))

Input interpretation:

$$8 \Big/ \left(5\left(1-\frac{1}{8}\times 0.0014499509782106902 2^{2}\times 6+\frac{1}{12}\times 0.0014499509782106902 2\times 0.00019753086419753\times 6\,(2-3)-\left(\frac{1}{48}\times 0.0014499509782106902 2\times 0.00019753086419753+\frac{1}{128}\times 0.0014499509782106902 2^{4}\right)\times 6\,(4-6+9)\right)\right)$$

Result:

1.600003152940094135224431404369109686572005456591369996155845731 3...

1.60000315294…

From

$$\begin{aligned}\Delta &= hu(k)-ku(h)\\ &= (h-k)\left[\tfrac{1}{2}u_2hk+\tfrac{1}{6}u_3hk(h+k)+\tfrac{1}{24}u_4hk(h^2+hk+k^2)+\cdots\right]\\ &= ab(a+b)\left[\tfrac{1}{2}\kappa+\tfrac{1}{6}\kappa_s(b-a)+\tfrac{1}{24}\kappa_{ss}(b^2-ab+a^2)+\cdots\right].\end{aligned} \quad (A.3)$$

$$ab(a+b)\left[\tfrac{1}{2}\kappa+\tfrac{1}{6}\kappa_s(b-a)+\tfrac{1}{24}\kappa_{ss}(b^2-ab+a^2)+\cdots\right].$$

For a = 2, b = 3 , κ = 0.0014499509782106902 2 κ_s = 0.00019753086419753

2*3(2+3) [1/2*0.0014499509782106902 2+1/6*0.00019753086419753(3-2)+1/24*0.00019753086419753*(9-6+4)]

Input interpretation:

$$2\times 3\,(2+3)\left(\frac{1}{2}\times 0.00144995097821069022+\frac{1}{6}\times 0.00019753086419753\,(3-2)+\frac{1}{24}\times 0.00019753086419753\,(9-6+4)\right)$$

Result:

0.0244653140558763908

0.0244653140558763908 = Δ

From

$$s=\frac{1}{2}(a+b+c)$$

1/2(2+3+4.99999014708162)

Input interpretation:

$$\frac{1}{2}\,(2+3+4.99999014708162)$$

Result:

4.99999507354081

4.99999507354081 = s

From:

$$\widetilde{\kappa}(A,B,C)=4\,\frac{\Delta}{abc}=\pm 4\,\frac{\sqrt{s(s-a)(s-b)(s-c)}}{abc} \tag{2.2}$$

4* ((sqrt(4.99999507354081*(((4.99999507354081-2)(4.99999507354081-3)(4.99999507354081-4.99999014708162)))))) /(2*3*4.99999014708162)

Input interpretation:

$$4\times\left(\sqrt{(4.99999507354081\,((4.99999507354081-2)\,(4.99999507354081-3)\,(4.99999507354081-4.99999014708162)))}\right)/(2\times 3\times 4.99999014708162)$$

Result:

0.0016209385802879138286424102354266290556765927447614036572717589
...

0.00162093858….

4*(0.0244653140558763908 / (2*3*4.99999014708162))

Input interpretation:

$$4\times\frac{0.0244653140558763908}{2\times 3\times 4.99999014708162}$$

Result:

0.0032620483022559868558283380325550518296083734268608145507677444
...

0.00326204830225….

(0.0016209385802879138286424102354266290556765927447614036572)x = 4*(0.0244653140558763908 / (2*3*4.99999014708162))

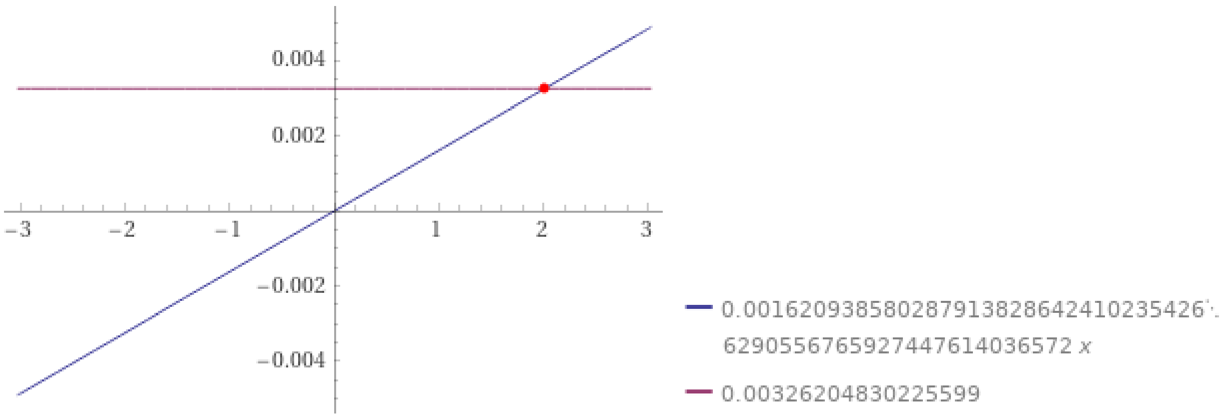
Input interpretation:

$$0.0016209385802879138286424102354266290556765927447614036572\,x = 4\times\frac{0.0244653140558763908}{2\times 3\times 4.99999014708162}$$

Result:

$$0.0016209385802879138286424102354266290556765927447614036572\,x = 0.00326204830225599$$

Plot:



Alternate form:

$0.0016209385802879138286424102354266290556765927447614036572\, x - 0.00326204830225599 = 0$

Solution:

$x \approx 2.01244411227264$

2.01244411227264

0.0008155120755639967139570845081387629574020933567152036376919361 / (((sqrt(4.99999507354081*(((4.99999507354081-2)(4.99999507354081-3)(4.99999507354081-4.99999014708162))))/(2*3*4.99999014708162))))

Input interpretation:

$$0.0008155120755639967139570845081387629574020933567152036376919361 / \left(\sqrt{4.99999507354081\,((4.99999507354081-2)(4.99999507354081-3)(4.99999507354081-4.99999014708162))} / (2\times 3\times 4.99999014708162)\right)$$

Result:

2.0124441122726416731564531537131106514079842298584861840996293953...

2.01244411227264167.......

0.000815512075563996713957084508 / (((sqrt(4.99999507354081*(((4.99999507354081-2)(4.99999507354081-3)(4.99999507354081-4.99999014708162))))/(2*3*4.99999014708162))))-2/5

Input interpretation:

$$0.000815512075563996713957084508 / \left(\sqrt{4.99999507354081\,((4.99999507354081-2)(4.99999507354081-3)(4.99999507354081-4.99999014708162))} / (2\times 3\times 4.99999014708162)\right) - \frac{2}{5}$$

Result:

1.6124441122726416731564531533706844568819805424347578332464042188

...

1.61244411227264….. result that is a good approximation to the value of the golden ratio 1.618033988749...

From:

Branes, Calabi–Yau Spaces, and Toroidal Compactification of the N=1 Six Dimensional E_8 Theory - *Ori J. Ganor, David R. Morrison and Nathan Seiberg* - https://arxiv.org/abs/hep-th/9610251v2

We have that:

We turn now to the E_n case, in which a surface S shrinks to a point. We assume that we are in the generic situation in which the image of $H^{1,1}(X) \to H^{1,1}(S)$ is one-dimensional. The coefficient c which governs the five-dimensional field theory is calculated by the intersection product $S \cdot S \cdot S$. In four dimensions, this is corrected by instantons to

$$\langle S\,S\,S\rangle = (S \cdot S \cdot S) + \sum_{j=1}^{\infty} N_j \frac{j^3 q^{j\gamma}}{1 - q^{j\gamma}}, \tag{5.23}$$

where γ is a homology class on S such that $S \cdot \gamma = -1$, and where N_j is the instanton number associated with rational curves in class $j\gamma$. In these E_n cases, unlike the previous two, there will be an infinite number of homology classes contributing to the instanton sum, but the answer is universal for the E_n theory in question (depending only on n—of course there is also a sum for $\widetilde{E}_1$). The number N_1 should be the number of "lines" on S, that is, the number of $\mathbf{CP}^1$'s whose "degree" $-S \cdot \gamma = c_1(S) \cdot \gamma$ is 1. The numbers N_j for $j > 1$ have a less straightforward interpretation, since the family of $\mathbf{CP}^1$'s in such a class usually has positive dimension.

In the case of E_0, the first several terms of this instanton expansion (5.23) were calculated in [55,56]:

$$9+3\frac{3^3q^{3\gamma}}{1-q^{3\gamma}}-6\frac{6^3q^{6\gamma}}{1-q^{6\gamma}}+27\frac{9^3q^{9\gamma}}{1-q^{9\gamma}}-192\frac{12^3q^{12\gamma}}{1-q^{12\gamma}}$$
$$+1695\frac{15^3q^{15\gamma}}{1-q^{15\gamma}}-17064\frac{18^3q^{18\gamma}}{1-q^{18\gamma}}+188454\frac{21^3q^{21\gamma}}{1-q^{21\gamma}}-\cdots, \tag{5.24}$$

9+((3*3^3*1/(((e^(2Pi))^(3)))))/(1-1/(((e^(2Pi))^(3)))) - ((6*6^3*1/(((e^(2Pi))^(6)))))/(1-1/(((e^(2Pi))^(6))))

Input:

$$9+\frac{3\times 3^3\times\frac{1}{(e^{2\pi})^3}}{1-\frac{1}{(e^{2\pi})^3}}-\frac{6\times 6^3\times\frac{1}{(e^{2\pi})^6}}{1-\frac{1}{(e^{2\pi})^6}}$$

Exact result:

$$9-\frac{1296\,e^{-12\pi}}{1-e^{-12\pi}}+\frac{81\,e^{-6\pi}}{1-e^{-6\pi}}$$

Decimal approximation:

9.000000527505331492485107712141675908301080175064687335058085514 7...

9.0000005275053…

Property:

$9-\frac{1296\,e^{-12\pi}}{1-e^{-12\pi}}+\frac{81\,e^{-6\pi}}{1-e^{-6\pi}}$ is a transcendental number

Alternate forms:

$$-\frac{9}{2}(-137+135\coth(6\pi)-9\,\mathrm{csch}(6\pi))$$

$$\frac{9\left(-136+9\,e^{6\pi}+e^{12\pi}\right)}{e^{12\pi}-1}$$

$$9+\frac{1296\,e^{-12\pi}}{e^{-12\pi}-1}-\frac{81\,e^{-6\pi}}{e^{-6\pi}-1}$$

Alternative representations:

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$9+\frac{81}{(e^{360^\circ})^3\left(1-\frac{1}{(e^{360^\circ})^3}\right)}-\frac{6\times 6^3}{(e^{360^\circ})^6\left(1-\frac{1}{(e^{360^\circ})^6}\right)}$$

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$9+\frac{81}{(e^{-2i\log(-1)})^3\left(1-\frac{1}{(e^{-2i\log(-1)})^3}\right)}-\frac{6\times 6^3}{(e^{-2i\log(-1)})^6\left(1-\frac{1}{(e^{-2i\log(-1)})^6}\right)}$$

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$9+\frac{3\times 3^3}{\left(1-\frac{1}{\exp^{2\pi}(z)^3}\right)\exp^{2\pi}(z)^3}-\frac{6\times 6^3}{\exp^{2\pi}(z)^6\left(1-\frac{1}{\exp^{2\pi}(z)^6}\right)} \quad \text{for } z=1$$

Series representations:

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=-\frac{1224}{-1+e^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+$$
$$\frac{81\,e^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{-1+e^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{9\,e^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{-1+e^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$-\frac{1224}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{81\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{9\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$-\frac{1224}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{81\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{24\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{9\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{48\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$-\frac{1224}{-1+e^{48\int_0^1\sqrt{1-t^2}\,dt}}+\frac{81\,e^{24\int_0^1\sqrt{1-t^2}\,dt}}{-1+e^{48\int_0^1\sqrt{1-t^2}\,dt}}+\frac{9\,e^{48\int_0^1\sqrt{1-t^2}\,dt}}{-1+e^{48\int_0^1\sqrt{1-t^2}\,dt}}$$

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$-\frac{1224}{-1+e^{36\int_0^\infty \sin^4(t)/t^4\,dt}}+\frac{81\,e^{18\int_0^\infty \sin^4(t)/t^4\,dt}}{-1+e^{36\int_0^\infty \sin^4(t)/t^4\,dt}}+\frac{9\,e^{36\int_0^\infty \sin^4(t)/t^4\,dt}}{-1+e^{36\int_0^\infty \sin^4(t)/t^4\,dt}}$$

$$9+\frac{3\times 3^3}{\left(1-\frac{1}{(e^{2\pi})^3}\right)(e^{2\pi})^3}-\frac{6\times 6^3}{(e^{2\pi})^6\left(1-\frac{1}{(e^{2\pi})^6}\right)}=$$
$$9-\frac{1296\,e^{-12\left(\frac{3\sqrt{3}}{4}+24\int_0^{\frac{1}{4}}\sqrt{t-t^2}\,dt\right)}}{1-e^{-12\left(\frac{3\sqrt{3}}{4}+24\int_0^{\frac{1}{4}}\sqrt{t-t^2}\,dt\right)}}+\frac{81\,e^{-6\left(\frac{3\sqrt{3}}{4}+24\int_0^{\frac{1}{4}}\sqrt{t-t^2}\,dt\right)}}{1-e^{-6\left(\frac{3\sqrt{3}}{4}+24\int_0^{\frac{1}{4}}\sqrt{t-t^2}\,dt\right)}}$$

((27*9^3*1/(((e^(2Pi))^(9)))))/(1-1/(((e^(2Pi))^(9)))) - ((192*12^3*1/(((e^(2Pi))^(12)))))/(1-1/(((e^(2Pi))^(12))))

Input:

$$\frac{27\times 9^3\times\frac{1}{(e^{2\pi})^9}}{1-\frac{1}{(e^{2\pi})^9}}-\frac{192\times 12^3\times\frac{1}{(e^{2\pi})^{12}}}{1-\frac{1}{(e^{2\pi})^{12}}}$$

Exact result:

$$\frac{19683\,e^{-18\pi}}{1-e^{-18\pi}}-\frac{331776\,e^{-24\pi}}{1-e^{-24\pi}}$$

Decimal approximation:

$5.4364684958075011949471662227261792332172529637723112403151\ldots\times 10^{-21}$

$5.43646849\ldots*10^{-21}$

Property:

$$-\frac{331\,776\, e^{-24\pi}}{1-e^{-24\pi}}+\frac{19\,683\, e^{-18\pi}}{1-e^{-18\pi}} \text{ is a transcendental number}$$

Alternate forms:

$$81\left(\frac{243}{e^{18\pi}-1}-\frac{4096}{e^{24\pi}-1}\right)$$

$$\frac{331\,776\, e^{-24\pi}}{e^{-24\pi}-1}-\frac{19\,683\, e^{-18\pi}}{e^{-18\pi}-1}$$

$$-\frac{81\left(243\, e^{-18\pi}\left(e^{-24\pi}-1\right)-4096\, e^{-24\pi}\left(e^{-18\pi}-1\right)\right)}{\left(e^{-24\pi}-1\right)\left(e^{-18\pi}-1\right)}$$

Alternative representations:

$$\frac{27\times 9^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^9}\right)\left(e^{2\pi}\right)^9}-\frac{192\times 12^3}{\left(e^{2\pi}\right)^{12}\left(1-\frac{1}{\left(e^{2\pi}\right)^{12}}\right)}=$$
$$\frac{27\times 9^3}{\left(e^{360^\circ}\right)^9\left(1-\frac{1}{\left(e^{360^\circ}\right)^9}\right)}-\frac{192\times 12^3}{\left(e^{360^\circ}\right)^{12}\left(1-\frac{1}{\left(e^{360^\circ}\right)^{12}}\right)}$$

$$\frac{27\times 9^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^9}\right)\left(e^{2\pi}\right)^9}-\frac{192\times 12^3}{\left(e^{2\pi}\right)^{12}\left(1-\frac{1}{\left(e^{2\pi}\right)^{12}}\right)}=$$
$$\frac{27\times 9^3}{\left(1-\frac{1}{\exp^{2\pi}(z)^9}\right)\exp^{2\pi}(z)^9}-\frac{192\times 12^3}{\exp^{2\pi}(z)^{12}\left(1-\frac{1}{\exp^{2\pi}(z)^{12}}\right)} \quad \text{for } z=1$$

$$\frac{27\times 9^3}{\left(1-\frac{1}{(e^{2\pi})^9}\right)(e^{2\pi})^9}-\frac{192\times 12^3}{(e^{2\pi})^{12}\left(1-\frac{1}{(e^{2\pi})^{12}}\right)}=$$
$$\frac{27\times 9^3}{(e^{-2i\log(-1)})^9\left(1-\frac{1}{(e^{-2i\log(-1)})^9}\right)}-\frac{192\times 12^3}{(e^{-2i\log(-1)})^{12}\left(1-\frac{1}{(e^{-2i\log(-1)})^{12}}\right)}$$

Series representations:

$$\frac{27\times 9^3}{\left(1-\frac{1}{(e^{2\pi})^9}\right)(e^{2\pi})^9}-\frac{192\times 12^3}{(e^{2\pi})^{12}\left(1-\frac{1}{(e^{2\pi})^{12}}\right)}=$$
$$\frac{19683}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{18\pi}}-\frac{331776}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{24\pi}}$$

$$\frac{27\times 9^3}{\left(1-\frac{1}{(e^{2\pi})^9}\right)(e^{2\pi})^9}-\frac{192\times 12^3}{(e^{2\pi})^{12}\left(1-\frac{1}{(e^{2\pi})^{12}}\right)}=$$
$$\frac{19683}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{18\pi}}-\frac{331776}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{24\pi}}$$

$$\frac{27\times 9^3}{\left(1-\frac{1}{(e^{2\pi})^9}\right)(e^{2\pi})^9}-\frac{192\times 12^3}{(e^{2\pi})^{12}\left(1-\frac{1}{(e^{2\pi})^{12}}\right)}=$$
$$-\frac{331776\,e^{-96\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{1-e^{-96\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{19683\,e^{-72\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{1-e^{-72\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$\frac{27\times 9^3}{\left(1-\frac{1}{(e^{2\pi})^9}\right)(e^{2\pi})^9}-\frac{192\times 12^3}{(e^{2\pi})^{12}\left(1-\frac{1}{(e^{2\pi})^{12}}\right)}=$$
$$-\frac{331\,776\,e^{-48\times\int_0^\infty 1/(1+t^2)\,dt}}{1-e^{-48\times\int_0^\infty 1/(1+t^2)\,dt}}+\frac{19\,683\,e^{-36\times\int_0^\infty 1/(1+t^2)\,dt}}{1-e^{-36\times\int_0^\infty 1/(1+t^2)\,dt}}$$

$$\frac{27\times 9^3}{\left(1-\frac{1}{(e^{2\pi})^9}\right)(e^{2\pi})^9}-\frac{192\times 12^3}{(e^{2\pi})^{12}\left(1-\frac{1}{(e^{2\pi})^{12}}\right)}=$$
$$-\frac{331\,776\,e^{-48\int_0^\infty \sin(t)/t\,dt}}{1-e^{-48\int_0^\infty \sin(t)/t\,dt}}+\frac{19\,683\,e^{-36\int_0^\infty \sin(t)/t\,dt}}{1-e^{-36\int_0^\infty \sin(t)/t\,dt}}$$

$$\frac{27\times 9^3}{\left(1-\frac{1}{(e^{2\pi})^9}\right)(e^{2\pi})^9}-\frac{192\times 12^3}{(e^{2\pi})^{12}\left(1-\frac{1}{(e^{2\pi})^{12}}\right)}=$$
$$-\frac{331\,776\,e^{-96\int_0^1\sqrt{1-t^2}\,dt}}{1-e^{-96\int_0^1\sqrt{1-t^2}\,dt}}+\frac{19\,683\,e^{-72\int_0^1\sqrt{1-t^2}\,dt}}{1-e^{-72\int_0^1\sqrt{1-t^2}\,dt}}$$

((1695*15^3*1/(((e^(2Pi))^(15)))))/(1-1/(((e^(2Pi))^(15)))) - ((17064*18^3*1/(((e^(2Pi))^(18)))))/(1-1/(((e^(2Pi))^(18))))

Input:

$$\frac{1695\times 15^3\times\frac{1}{(e^{2\pi})^{15}}}{1-\frac{1}{(e^{2\pi})^{15}}}-\frac{17\,064\times 18^3\times\frac{1}{(e^{2\pi})^{18}}}{1-\frac{1}{(e^{2\pi})^{18}}}$$

Exact result:

$$\frac{5\,720\,625\,e^{-30\pi}}{1-e^{-30\pi}}-\frac{99\,517\,248\,e^{-36\pi}}{1-e^{-36\pi}}$$

Decimal approximation:

$6.701203632657073730473588097086461463497027503851186013345 7\ldots \times 10^{-35}$

$6.701203632\ldots*10^{-35}$

Property:

$-\frac{99517248\, e^{-36\pi}}{1-e^{-36\pi}} + \frac{5720625\, e^{-30\pi}}{1-e^{-30\pi}}$ is a transcendental number

Alternate forms:

$$\frac{5720625}{e^{30\pi}-1} - \frac{99517248}{e^{36\pi}-1}$$

$$\frac{99517248\, e^{-36\pi}}{e^{-36\pi}-1} - \frac{5720625\, e^{-30\pi}}{e^{-30\pi}-1}$$

$$-\frac{81\left(70625\, e^{-30\pi}\left(e^{-36\pi}-1\right) - 1228608\, e^{-36\pi}\left(e^{-30\pi}-1\right)\right)}{\left(e^{-36\pi}-1\right)\left(e^{-30\pi}-1\right)}$$

Alternative representations:

$$\frac{1695\times 15^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{15}}\right)\left(e^{2\pi}\right)^{15}} - \frac{17064\times 18^3}{\left(e^{2\pi}\right)^{18}\left(1-\frac{1}{\left(e^{2\pi}\right)^{18}}\right)} = \frac{1695\times 15^3}{\left(e^{360^\circ}\right)^{15}\left(1-\frac{1}{\left(e^{360^\circ}\right)^{15}}\right)} - \frac{17064\times 18^3}{\left(e^{360^\circ}\right)^{18}\left(1-\frac{1}{\left(e^{360^\circ}\right)^{18}}\right)}$$

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$\frac{1695\times 15^3}{\left(1-\frac{1}{\exp^{2\pi}(z)^{15}}\right)\exp^{2\pi}(z)^{15}}-\frac{17064\times 18^3}{\exp^{2\pi}(z)^{18}\left(1-\frac{1}{\exp^{2\pi}(z)^{18}}\right)}\quad \text{for } z=1$$

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$\frac{1695\times 15^3}{(e^{-2i\log(-1)})^{15}\left(1-\frac{1}{(e^{-2i\log(-1)})^{15}}\right)}-\frac{17064\times 18^3}{(e^{-2i\log(-1)})^{18}\left(1-\frac{1}{(e^{-2i\log(-1)})^{18}}\right)}$$

Series representations:

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$\frac{5720625}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{30\pi}}-\frac{99517248}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{36\pi}}$$

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$\frac{5720625}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{30\pi}}-\frac{99517248}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{36\pi}}$$

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$-\frac{99517248\,e^{-144\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{1-e^{-144\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}+\frac{5720625\,e^{-120\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}{1-e^{-120\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

Integral representations:

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$-\frac{99517248\,e^{-72\times\int_0^\infty 1/(1+t^2)\,dt}}{1-e^{-72\times\int_0^\infty 1/(1+t^2)\,dt}}+\frac{5720625\,e^{-60\times\int_0^\infty 1/(1+t^2)\,dt}}{1-e^{-60\times\int_0^\infty 1/(1+t^2)\,dt}}$$

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$-\frac{99517248\,e^{-72\int_0^\infty \sin(t)/t\,dt}}{1-e^{-72\int_0^\infty \sin(t)/t\,dt}}+\frac{5720625\,e^{-60\int_0^\infty \sin(t)/t\,dt}}{1-e^{-60\int_0^\infty \sin(t)/t\,dt}}$$

$$\frac{1695\times 15^3}{\left(1-\frac{1}{(e^{2\pi})^{15}}\right)(e^{2\pi})^{15}}-\frac{17064\times 18^3}{(e^{2\pi})^{18}\left(1-\frac{1}{(e^{2\pi})^{18}}\right)}=$$
$$-\frac{99517248\,e^{-144\int_0^1\sqrt{1-t^2}\,dt}}{1-e^{-144\int_0^1\sqrt{1-t^2}\,dt}}+\frac{5720625\,e^{-120\int_0^1\sqrt{1-t^2}\,dt}}{1-e^{-120\int_0^1\sqrt{1-t^2}\,dt}}$$

((188454*21^3*1/(((e^(2Pi))^(21))))/(1-1/(((e^(2Pi))^(21))))

Input:

$$\frac{188454\times 21^3\times\frac{1}{(e^{2\pi})^{21}}}{1-\frac{1}{(e^{2\pi})^{21}}}$$

Exact result:

$$\frac{1745272494\,e^{-42\pi}}{1-e^{-42\pi}}$$

Decimal approximation:

$8.6707443737701282599401326463710723583182697569362310972868\ldots \times 10^{-49}$

$8.670744373\ldots*10^{-49}$

Property:

$\frac{1745272494\, e^{-42\pi}}{1-e^{-42\pi}}$ is a transcendental number

Alternate forms:

$$\frac{1745272494}{e^{42\pi}-1}$$

$$-\frac{1745272494\, e^{-42\pi}}{e^{-42\pi}-1}$$

$$1745272494 \Big/ \left((e^{\pi}-1)(1+e^{\pi})\left(1-e^{\pi}+e^{2\pi}\right)\left(1+e^{\pi}+e^{2\pi}\right)\right.$$
$$\left(1-e^{\pi}+e^{2\pi}-e^{3\pi}+e^{4\pi}-e^{5\pi}+e^{6\pi}\right)\left(1+e^{\pi}+e^{2\pi}+e^{3\pi}+e^{4\pi}+e^{5\pi}+e^{6\pi}\right)$$
$$\left(1-e^{\pi}+e^{3\pi}-e^{4\pi}+e^{6\pi}-e^{8\pi}+e^{9\pi}-e^{11\pi}+e^{12\pi}\right)$$
$$\left.\left(1+e^{\pi}-e^{3\pi}-e^{4\pi}+e^{6\pi}-e^{8\pi}-e^{9\pi}+e^{11\pi}+e^{12\pi}\right)\right)$$

Alternative representations:

$$\frac{188454\times 21^3}{\left(1-\frac{1}{(e^{2\pi})^{21}}\right)(e^{2\pi})^{21}} = \frac{188454\times 21^3}{(e^{360^\circ})^{21}\left(1-\frac{1}{(e^{360^\circ})^{21}}\right)}$$

$$\frac{188454\times 21^3}{\left(1-\frac{1}{(e^{2\pi})^{21}}\right)(e^{2\pi})^{21}} = \frac{188454\times 21^3}{(e^{-2i\log(-1)})^{21}\left(1-\frac{1}{(e^{-2i\log(-1)})^{21}}\right)}$$

$$\frac{188454\times 21^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{21}}\right)\left(e^{2\pi}\right)^{21}} = \frac{188454\times 21^3}{\left(1-\frac{1}{\exp^{2\pi}(z)^{21}}\right)\exp^{2\pi}(z)^{21}} \quad \text{for } z = 1$$

Series representations:

$$\frac{188454\times 21^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{21}}\right)\left(e^{2\pi}\right)^{21}} = \frac{1745272494}{-1+e^{168\sum_{k=0}^{\infty}(-1)^k/(1+2k)}}$$

$$\frac{188454\times 21^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{21}}\right)\left(e^{2\pi}\right)^{21}} = \frac{1745272494}{-1+\left(\sum_{k=0}^{\infty}\frac{1}{k!}\right)^{42\pi}}$$

$$\frac{188454\times 21^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{21}}\right)\left(e^{2\pi}\right)^{21}} = \frac{1745272494}{-1+\left(\frac{1}{\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}}\right)^{42\pi}}$$

Integral representations:

$$\frac{188454\times 21^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{21}}\right)\left(e^{2\pi}\right)^{21}} = \frac{1745272494}{-1+e^{168\int_0^1\sqrt{1-t^2}\,dt}}$$

$$\frac{188454\times 21^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{21}}\right)\left(e^{2\pi}\right)^{21}} = \frac{1745272494}{-1+e^{84\times\int_0^{\infty}1/\left(1+t^2\right)dt}}$$

$$\frac{188454\times 21^3}{\left(1-\frac{1}{\left(e^{2\pi}\right)^{21}}\right)\left(e^{2\pi}\right)^{21}} = \frac{1745272494}{-1+e^{84\times\int_0^1 1/\sqrt{1-t^2}\,dt}}$$

From the algebraic sum of the previous solutions, we obtain:

(9.00000052750533149248510771214167590830108017506468733505808 55147+5.4364684958075× 10^-21+6.70120363265707373× 10^-35+8.670744373770128259× 10^-49)

Input interpretation:

$$9.0000005275053314924851077121416759083010801750646873350580855147+5.4364684958075\times 10^{-21}+6.70120363265707373\times 10^{-35}+8.670744373770128259\times 10^{-49}$$

Result:

9.000000527505331492490544180637483475313116501636291709495462527 5...

9.0000005275….. ≈ 9

We have that:

(9.0000005275+5.43646849580× 10^-21+6.70120363265× 10^-35+8.67074437377× 10^-49)^3-1

Input interpretation:

$$\left(9.0000005275+5.43646849580\times 10^{-21}+6.70120363265\times 10^{-35}+8.67074437377\times 10^{-49}\right)^3-1$$

Result:

728.000128182507512920217842171212225924984544821136477426357277 68...

728.0001281825… ≈ 728 = 9^3 -1 (Ramanujan taxicab number)

((728/(((9.0000005275+5.43646849580× 10^-21+6.70120363265× 10^-35+8.67074437377× 10^-49)^3-1))))^4096

Input interpretation:

$$\left(728/\left(\left(9.0000005275+5.43646849580\times 10^{-21}+6.70120363265\times 10^{-35}+8.67074437377\times 10^{-49}\right)^3-1\right)\right)^{4096}$$

Result:

0.9992790573879574896787727761566644458024208411481819211683953626...

0.99927905738…. result very near to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\dots}}}}\approx 0.9991104684$$

Now, we have that:

$$\frac{f^3}{g^2}=\frac{27}{4}+11664e^{2\pi i\tau}+\cdots$$

$$\frac{f^3}{g^2}-\frac{27}{4}=11664q+c_1q^{\psi-\alpha_1}+c_2q^{2\psi-\alpha_2}+\cdots$$

((27/4+11664*(e^(2Pi))))

Input:

$$\frac{27}{4}+11664\,e^{2\pi}$$

Decimal approximation:

$6.2459814200408558865715673803266463247571268232448318944760 4\ldots\times 10^6$

$6.24598142004\ldots*10^6$

Property:

$\frac{27}{4} + 11664\, e^{2\pi}$ is a transcendental number

Alternate form:

$$\frac{27}{4}\left(1 + 1728\, e^{2\pi}\right)$$

Alternative representations:

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664\, e^{-2 i \log(-1)}$$

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664 \exp^{2\pi}(z) \quad \text{for } z = 1$$

Series representations:

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664\, e^{8 \sum_{k=0}^{\infty} (-1)^k / (1+2k)}$$

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664 \left(\sum_{k=0}^{\infty} \frac{1}{k!}\right)^{2\pi}$$

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664 \left(\frac{1}{\sum_{k=0}^{\infty} \frac{(-1)^k}{k!}}\right)^{2\pi}$$

Integral representations:

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664\, e^{8 \int_0^1 \sqrt{1-t^2}\, dt}$$

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664\, e^{4 \times \int_0^1 1/\sqrt{1-t^2}\, dt}$$

$$\frac{27}{4} + 11664\, e^{2\pi} = \frac{27}{4} + 11664\, e^{4 \times \int_0^\infty 1/(1+t^2)\, dt}$$

ln((27/4+11664*(e^(2Pi))))

Input:

$$\log\left(\frac{27}{4} + 11664\, e^{2\pi}\right)$$

$\log(x)$ is the natural logarithm

Decimal approximation:

15.647448842123467205411867953032030899510359662170469488796823066
…

15.647448842123… result very near to the S_{BH} black hole entropy 15.6730

Alternate form:

$$-2\log(2) + 3\log(3) + \log\left(1 + 1728\, e^{2\pi}\right)$$

Alternative representations:

$$\log\left(\frac{27}{4} + 11664\, e^{2\pi}\right) = \log_e\left(\frac{27}{4} + 11664\, e^{2\pi}\right)$$

$$\log\left(\frac{27}{4} + 11\,664\, e^{2\pi}\right) = \log(a) \log_a\left(\frac{27}{4} + 11\,664\, e^{2\pi}\right)$$

$$\log\left(\frac{27}{4} + 11\,664\, e^{2\pi}\right) = -\text{Li}_1\left(1 - \frac{27}{4} - 11\,664\, e^{2\pi}\right)$$

Series representations:

$$\log\left(\frac{27}{4} + 11\,664\, e^{2\pi}\right) = \log\left(\frac{23}{4} + 11\,664\, e^{2\pi}\right) - \sum_{k=1}^{\infty} \frac{\left(-\frac{4}{23+46656\, e^{2\pi}}\right)^k}{k}$$

$$\log\left(\frac{27}{4} + 11\,664\, e^{2\pi}\right) = 2\, i\, \pi \left\lfloor \frac{\arg\left(\frac{27}{4} + 11\,664\, e^{2\pi} - x\right)}{2\pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{27}{4} + 11\,664\, e^{2\pi} - x\right)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log\left(\frac{27}{4} + 11\,664\, e^{2\pi}\right) = 2\, i\, \pi \left\lfloor \frac{\pi - \arg\left(\frac{1}{z_0}\right) - \arg(z_0)}{2\pi} \right\rfloor + \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{27}{4} + 11\,664\, e^{2\pi} - z_0\right)^k z_0^{-k}}{k}$$

Integral representations:

$$\log\left(\frac{27}{4} + 11\,664\, e^{2\pi}\right) = \int_1^{\frac{27}{4}+11\,664\, e^{2\pi}} \frac{1}{t}\, dt$$

$$\log\left(\frac{27}{4} + 11664\, e^{2\pi}\right) = -\frac{i}{2\pi} \int_{-i\,\infty+\gamma}^{i\,\infty+\gamma} \frac{\left(\frac{4}{23+46656\, e^{2\pi}}\right)^s \Gamma(-s)^2\, \Gamma(1+s)}{\Gamma(1-s)}\, ds$$
for $-1 < \gamma < 0$

$\Gamma(x)$ is the gamma function

1+((1/(((ln((27/4+11664*(e^(2Pi)))))))^1/6))

Input:

$$1 + \frac{1}{\sqrt[6]{\log\left(\frac{27}{4} + 11664\, e^{2\pi}\right)}}$$

$\log(x)$ is the natural logarithm

Decimal approximation:

1.6323042146192028989509628150427039104653519172643778287298053215

...

1.6323042146192….. result very near to the mean between $\zeta(2) = \frac{\pi^2}{6} = 1.644934$ ... and the value of golden ratio 1.61803398…, i.e. 1.63148399

Alternate forms:

$$1 + \frac{1}{\sqrt[6]{-2\log(2) + 3\log(3) + \log\left(1 + 1728\, e^{2\pi}\right)}}$$

$$\frac{1 + \sqrt[6]{\log\left(\frac{27}{4} + 11664\, e^{2\pi}\right)}}{\sqrt[6]{\log\left(\frac{27}{4} + 11664\, e^{2\pi}\right)}}$$

$$\frac{1+\sqrt[6]{-2\log(2)+3\log(3)+\log\left(1+1728\,e^{2\pi}\right)}}{\sqrt[6]{-2\log(2)+3\log(3)+\log\left(1+1728\,e^{2\pi}\right)}}$$

Alternative representations:

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11\,664\,e^{2\pi}\right)}}=1+\frac{1}{\sqrt[6]{\log_e\left(\frac{27}{4}+11\,664\,e^{2\pi}\right)}}$$

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11\,664\,e^{2\pi}\right)}}=1+\frac{1}{\sqrt[6]{\log(a)\log_a\left(\frac{27}{4}+11\,664\,e^{2\pi}\right)}}$$

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11\,664\,e^{2\pi}\right)}}=1+\frac{1}{\sqrt[6]{-\text{Li}_1\left(1-\frac{27}{4}-11\,664\,e^{2\pi}\right)}}$$

Series representations:

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11\,664\,e^{2\pi}\right)}}=1+\frac{1}{\sqrt[6]{\log\left(\frac{23}{4}+11\,664\,e^{2\pi}\right)-\sum_{k=1}^{\infty}\frac{\left(-\frac{4}{23+46\,656\,e^{2\pi}}\right)^k}{k}}}$$

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11664\,e^{2\pi}\right)}}=$$

$$1+\frac{1}{\sqrt[6]{2\,i\,\pi\left\lfloor\frac{\arg\left(\frac{27}{4}+11664\,e^{2\pi}-x\right)}{2\pi}\right\rfloor+\log(x)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{27}{4}+11664\,e^{2\pi}-x\right)^k x^{-k}}{k}}}\quad\text{for}$$

$x<0$

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11664\,e^{2\pi}\right)}}=$$

$$1+\frac{1}{\sqrt[6]{2\,i\,\pi\left\lfloor\frac{\pi-\arg\left(\frac{1}{z_0}\right)-\arg(z_0)}{2\pi}\right\rfloor+\log(z_0)-\sum_{k=1}^{\infty}\frac{(-1)^k\left(\frac{27}{4}+11664\,e^{2\pi}-z_0\right)^k z_0^{-k}}{k}}}$$

Integral representations:

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11664\,e^{2\pi}\right)}}=1+\frac{1}{\sqrt[6]{\int_1^{\frac{27}{4}+11664\,e^{2\pi}}\frac{1}{t}\,dt}}$$

$$1+\frac{1}{\sqrt[6]{\log\left(\frac{27}{4}+11664\,e^{2\pi}\right)}}=1+\frac{\sqrt[6]{2\pi}}{\sqrt[6]{-i\int_{-i\,\infty+\gamma}^{i\,\infty+\gamma}\frac{\left(\frac{23}{4}+11664\,e^{2\pi}\right)^{-s}\Gamma(-s)^2\,\Gamma(1+s)}{\Gamma(1-s)}\,ds}}$$

for $-1<\gamma<0$

$\Gamma(x)$ is the gamma function

Mathematical connections with some sectors of String Theory

From:

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

We have that:

Hence

$$\begin{aligned} 64g_{22}^{24} &= e^{\pi\sqrt{22}} - 24 + 276e^{-\pi\sqrt{22}} - \cdots, \\ 64g_{22}^{-24} &= \qquad\qquad 4096e^{-\pi\sqrt{22}} + \cdots, \end{aligned}$$

so that

$$64(g_{22}^{24} + g_{22}^{-24}) = e^{\pi\sqrt{22}} - 24 + 4372e^{-\pi\sqrt{22}} + \cdots = 64\{(1+\sqrt{2})^{12} + (1-\sqrt{2})^{12}\}.$$

Hence

$$e^{\pi\sqrt{22}} = 2508951.9982\ldots.$$

Again

$$G_{37} = (6+\sqrt{37})^{\frac{1}{4}},$$

$$\begin{aligned} 64G_{37}^{24} &= e^{\pi\sqrt{37}} + 24 + 276e^{-\pi\sqrt{37}} + \cdots, \\ 64G_{37}^{-24} &= \qquad\qquad 4096e^{-\pi\sqrt{37}} - \cdots, \end{aligned}$$

so that

$$64(G_{37}^{24} + G_{37}^{-24}) = e^{\pi\sqrt{37}} + 24 + 4372e^{-\pi\sqrt{37}} - \cdots = 64\{(6+\sqrt{37})^{6} + (6-\sqrt{37})^{6}\}.$$

Hence

$$e^{\pi\sqrt{37}} = 199148647.999978\ldots.$$

Similarly, from

$$g_{58} = \sqrt{\left(\frac{5+\sqrt{29}}{2}\right)},$$

we obtain

$$64(g_{58}^{24} + g_{58}^{-24}) = e^{\pi\sqrt{58}} - 24 + 4372e^{-\pi\sqrt{58}} + \cdots = 64\left\{\left(\frac{5+\sqrt{29}}{2}\right)^{12} + \left(\frac{5-\sqrt{29}}{2}\right)^{12}\right\}.$$

Hence

$$e^{\pi\sqrt{58}} = 24591257751.99999982\ldots.$$

From:

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

From the following vacuum equations:

$$T\, e^{\gamma_E\, \phi} \;=\; -\,\frac{\beta_E^{(p)}\, h^2}{\gamma_E}\; e^{-2\,(8-p)\,C + 2\,\beta_E^{(p)}\,\phi}$$

$$16\, k'\, e^{-2C} \;=\; \frac{h^2\left(p\,+\,1\,-\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}}{(7\,-\,p)}$$

$$(A')^2 \;=\; k\, e^{-2A} \;+\; \frac{h^2}{16(p\,+\,1)}\left(7\,-\,p\,+\,\frac{2\,\beta_E^{(p)}}{\gamma_E}\right) e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

we have obtained, from the results almost equals of the equations, putting

$4096\, e^{-\pi\sqrt{18}}$ instead of

$$e^{-2\,(8-p)\,C+2\,\beta_E^{(p)}\,\phi}$$

a new possible mathematical connection between the two exponentials. Thence, also the values concerning p, C, β_E and ϕ correspond to the exponents of e (i.e. of exp). Thence we obtain for p = 5 and β_E = 1/2:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

Therefore, with respect to the exponentials of the vacuum equations, the Ramanujan's exponential has a coefficient of 4096 which is equal to 642, while -6C+ϕ is equal to -$\pi\sqrt{18}$. From this it follows that it is possible to establish mathematically, the dilaton value.

For

exp((-Pi*sqrt(18)) we obtain:

Input:

$$\exp\left(-\pi\sqrt{18}\right)$$

Exact result:

$$e^{-3\sqrt{2}\,\pi}$$

Decimal approximation:

$$1.627201622607250929294215673911797954183858113695401 6\ldots \times 10^{-6}$$

$1.6272016\ldots * 10^{-6}$

Property:

$e^{-3\sqrt{2}\,\pi}$ is a transcendental number

Series representations:

$$e^{-\pi\sqrt{18}} = e^{-\pi\sqrt{17}\sum_{k=0}^{\infty} 17^{-k}\binom{1/2}{k}}$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$e^{-\pi\sqrt{18}} = \exp\left(-\frac{\pi\sum_{j=0}^{\infty}\mathrm{Res}_{s=-\frac{1}{2}+j}\,17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now, we have the following calculations:

$$e^{-6C+\phi} = 4096e^{-\pi\sqrt{18}}$$

$e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^-6

from which:

$\frac{1}{4096}e^{-6C+\phi}$ = 1.6272016… * 10^-6

0.000244140625 $e^{-6C+\phi}$ = $e^{-\pi\sqrt{18}}$ = 1.6272016… * 10^-6

Now:

$$\ln\left(e^{-\pi\sqrt{18}}\right) = -13.328648814475 = -\pi\sqrt{18}$$

And:

(1.6272016* 10^-6) *1/ (0.000244140625)

Input interpretation:

$$\frac{1.6272016}{10^6} \times \frac{1}{0.000244140625}$$

Result:

0.0066650177536

0.006665017...

Thence:

$$0.000244140625\, e^{-6C+\phi} = e^{-\pi\sqrt{18}}$$

Dividing both sides by 0.000244140625, we obtain:

$$\frac{0.000244140625}{0.000244140625}\, e^{-6C+\phi} = \frac{1}{0.000244140625}\, e^{-\pi\sqrt{18}}$$

$$e^{-6C+\phi} = 0.0066650177536$$

((((exp((-Pi*sqrt(18)))))))*1/0.000244140625

Input interpretation:

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625}$$

Result:

0.00666501785…

0.00666501785…

Series representations:

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}17^{-k}\binom{\frac{1}{2}}{k}\right)$$

$$\frac{\exp\left(-\pi\sqrt{18}\right)}{0.000244141} = 4096\exp\left(-\pi\sqrt{17}\sum_{k=0}^{\infty}\frac{\left(-\frac{1}{17}\right)^k\left(-\frac{1}{2}\right)_k}{k!}\right)$$

$$\frac{\exp(-\pi\sqrt{18})}{0.000244141} = 4096\exp\left(-\frac{\pi\sum_{j=0}^{\infty}\operatorname{Res}_{s=-\frac{1}{2}+j}17^{-s}\,\Gamma\left(-\frac{1}{2}-s\right)\Gamma(s)}{2\sqrt{\pi}}\right)$$

Now:

$$e^{-6C+\phi} = 0.0066650177536$$

$$\exp\left(-\pi\sqrt{18}\right)\times\frac{1}{0.000244140625} =$$

$$e^{-\pi\sqrt{18}}\times\frac{1}{0.000244140625}$$

$$= 0.00666501785\ldots$$

From:

ln(0.00666501784619)

Input interpretation:

$\log(0.00666501784619)$

Result:

$-5.010882647757\ldots$

-5.010882647757…

Alternative representations:

$\log(0.006665017846190000) = \log_e(0.006665017846190000)$

$\log(0.006665017846190000) = \log(a)\log_a(0.006665017846190000)$

$\log(0.006665017846190000) = -\text{Li}_1(0.993334982153810000)$

Series representations:

$$\log(0.00666501784619000 0) = -\sum_{k=1}^{\infty} \frac{(-1)^k (-0.99333498215381000 0)^k}{k}$$

$$\log(0.00666501784619000 0) = 2 i \pi \left\lfloor \frac{\arg(0.00666501784619000 0 - x)}{2 \pi} \right\rfloor + \log(x) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.00666501784619000 0 - x)^k x^{-k}}{k} \quad \text{for } x < 0$$

$$\log(0.00666501784619000 0) = \left\lfloor \frac{\arg(0.00666501784619000 0 - z_0)}{2 \pi} \right\rfloor \log\left(\frac{1}{z_0}\right) + \log(z_0) + \left\lfloor \frac{\arg(0.00666501784619000 0 - z_0)}{2 \pi} \right\rfloor \log(z_0) - \sum_{k=1}^{\infty} \frac{(-1)^k (0.00666501784619000 0 - z_0)^k z_0^{-k}}{k}$$

Integral representation:

$$\log(0.00666501784619000 0) = \int_1^{0.00666501784619000 0} \frac{1}{t} \, dt$$

In conclusion:

$$-6C + \phi = -5.010882647757 \ldots$$

and for C = 1, we obtain:

$\phi = -5.010882647757 + 6 = \mathbf{0.989117352243} = \boldsymbol{\phi}$

Note that the values of n_s (spectral index) 0.965, of the average of the Omega mesons Regge slope 0.987428571 and of the dilaton 0.989117352243, are also connected to the following two Rogers-Ramanujan continued fractions:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5\sqrt[4]{5^3}}-1}}-\varphi+1}=1-\cfrac{e^{-\pi\sqrt{5}}}{1+\cfrac{e^{-2\pi\sqrt{5}}}{1+\cfrac{e^{-3\pi\sqrt{5}}}{1+\cfrac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}}\approx 0.9991104684$$

(http://www.bitman.name/math/article/102/109/)

The mean between the two results of the above Rogers-Ramanujan continued fractions is 0.97798855285, value very near to the ψ Regge slope 0.979:

Ψ	3	$m_c = 1500$	0.979	-0.09

Also performing the 512th root of the inverse value of the Pion meson rest mass 139.57, we obtain:

((1/(139.57)))^1/512

Input interpretation:

$$\sqrt[512]{\frac{1}{139.57}}$$

Result:

0.990400732708644027550973755713301415460732796178555551684...

0.99040073.... result very near to the dilaton value $\mathbf{0.989117352243 = \phi}$ and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{\sqrt{5}}}}{\frac{\sqrt{5}}{1+\sqrt[5]{\sqrt{\varphi^5 \sqrt[4]{5^3}}-1}}-\varphi+1} = 1-\frac{e^{-\pi\sqrt{5}}}{1+\frac{e^{-2\pi\sqrt{5}}}{1+\frac{e^{-3\pi\sqrt{5}}}{1+\frac{e^{-4\pi\sqrt{5}}}{1+\ldots}}}} \approx 0.9991104684$$

From

AdS Vacua from Dilaton Tadpoles and Form Fluxes - *J. Mourad and A. Sagnotti* - arXiv:1612.08566v2 [hep-th] 22 Feb 2017 - March 27, 2018

We have:

$$\begin{aligned} e^{2C} &= \frac{2\,\xi\,e^{\frac{\phi}{2}}}{1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}} \\ \frac{h^2}{32} &= \frac{\xi^7\,e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\,e^{2\phi}}\right) + 5\,T\,e^{2\phi}\right] . \end{aligned} \tag{2.7}$$

For

$T = \frac{16}{\pi^2}$

$\xi = 1$

we obtain:

(2*e^(0.989117352243/2)) / (1+sqrt(((1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))

Input interpretation:

$$\frac{2\,e^{0.989117352243/2}}{1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}}$$

Result:

0.83941881822… −
1.4311851867… i

Polar coordinates:

$r = 1.65919106525$ (radius), $\theta = -59.607521917°$ (angle)

1.65919106525….. result very near to the 14th root of the following Ramanujan's class invariant $Q = (G_{505}/G_{101/5})^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.49455867612150000}}{1+\sqrt{-\frac{16\,e^{1.97823470448600000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}}$$

$$\frac{2\,e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\,e^{0.49455867612150000}}{1+\sqrt{-\frac{16\,e^{1.97823470448600000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.97823470448600000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}}$$

$$\frac{2\, e^{0.98911735224300000/2}}{1+\sqrt{1-\frac{16\, e^{2\times 0.98911735224300000}}{3\,\pi^2}}} = \frac{2\, e^{0.49455867612150000}}{1+\sqrt{z_0}\, \sum_{k=0}^{\infty} \frac{(-1)^k \left(-\frac{1}{2}\right)_k \left(1-\frac{16\, e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From

$$\frac{h^2}{32} = \frac{\xi^7\, e^{4\phi}}{\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\, e^{2\phi}}\right)^7} \left[\frac{42}{\xi}\left(1 \pm \sqrt{1 - \frac{\xi T}{3}\, e^{2\phi}}\right) + 5\, T\, e^{2\phi}\right]$$

we obtain:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}}\right)^7} \left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\, e^{2\times 0.989117352243}\right)$$

Result:

50.84107889... −
20.34506335... i

Polar coordinates:

$r = 54.76072411$ (radius), $\theta = -21.80979492°$ (angle)

54.76072411…..

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.98911735224300000}}{\pi^2}\right)\right.$$

$$\left. e^{4\times 0.98911735224300000}\right)\Big/\left(1+\sqrt{1-\frac{16\,e^{2\times 0.98911735224300000}}{3\,\pi^2}}\right)^7 =$$

$$\left(2\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\right.\right.$$

$$\left.\left.\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/$$

$$\left(\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not $(z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0))$

From which:

e^(4*0.989117352243) / (((1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))))^7 [42(1+sqrt(1-1/3*16/(Pi)^2*e^(2*0.989117352243)))+5*16/(Pi)^2*e^(2*0.989117352243)]*1/34

Input interpretation:

$$\frac{e^{4\times 0.989117352243}}{\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1-\frac{1}{3}\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}}\right)+5\times\frac{16}{\pi^2}\,e^{2\times 0.989117352243}\right)\times\frac{1}{34}$$

Result:

1.495325850... −
0.5983842161... i

Polar coordinates:

$r = 1.610609533$ (radius), $\theta = -21.80979492°$ (angle)

1.610609533…. result that is a good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\left(\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(17\,\pi^2\left(1+\sqrt{-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}}\sum_{k=0}^{\infty}\frac{\left(-\frac{3}{16}\right)^k\left(-\frac{e^{1.978234704486000}}{\pi^2}\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$\left(\left(42\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)+\frac{5\times 16\,e^{2\times 0.9891173522430000}}{\pi^2}\right)e^{4\times 0.9891173522430000}\right)\Big/\left(34\left(1+\sqrt{1-\frac{16\,e^{2\times 0.9891173522430000}}{3\,\pi^2}}\right)^7\right)=$$

$$\left(40\,e^{5.934704113458000}+21\,e^{3.956469408972000}\,\pi^2+21\,e^{3.956469408972000}\,\pi^2\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/$$

$$\left(17\,\pi^2\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1-\frac{16\,e^{1.978234704486000}}{3\,\pi^2}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

Now, we have:

$$e^{2C} = \frac{2\,\xi\,e^{-\frac{\phi}{2}}}{1+\sqrt{1+\frac{\xi\Lambda}{3}\,e^{2\phi}}}\,, \tag{2.9}$$

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right]. \tag{2.10}$$

For:

$\xi = 1$

$\Lambda \simeq \frac{4\pi^2}{25}$

$\phi = 0.989117352243$

From

$$e^{2C} = \frac{2\,\xi\, e^{-\frac{\phi}{2}}}{1 + \sqrt{1 + \frac{\xi\Lambda}{3}\, e^{2\phi}}},$$

we obtain:

((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))

Input interpretation:

$$\frac{2\, e^{-0.989117352243/2}}{1 + \sqrt{1 + \frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right) e^{2\times 0.989117352243}}}$$

Result:

0.382082347529...

0.382082347529….

Series representations:

$$\frac{2\, e^{-0.98911735224330000/2}}{1 + \sqrt{1 + \frac{(4\,\pi^2)\, e^{2\times 0.98911735224330000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.49455867612165000} \left(1 + \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)\right)$$

$$\frac{2\, e^{-0.98911735224330000/2}}{1 + \sqrt{1 + \frac{(4\,\pi^2)\, e^{2\times 0.98911735224330000}}{3\times 25}}} = 2 \Bigg/ \left(e^{0.49455867612165000} \left(1 + \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \left(-\frac{1}{2}\right)_k}{k!}\right)\right)$$

$$\frac{2\, e^{-0.98911735224300000/2}}{1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.98911735224300000}}{3\times 25}}} = \frac{2}{e^{0.49455867612150000}\left(1+\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.97823470448600000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

From which:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))))))))

Input interpretation:

$$1+\frac{1}{4\times\frac{2\, e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\,(4\pi^2)\right)e^{2\times 0.989117352243}}}}$$

Result:

1.65430921270...

1.6543092….. We note that, the result 1.6543092... is very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Indeed:

$$G_{505} = P^{-1/4}Q^{1/6} = (\sqrt{5}+2)^{1/2}\left(\frac{\sqrt{5}+1}{2}\right)^{1/4}(\sqrt{101}+10)^{1/4}$$
$$\times\left((130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}}\right)^{1/6}.$$

Thus, it remains to show that

$$(130\sqrt{5}+29\sqrt{101})+\sqrt{169440+7540\sqrt{505}} = \left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3,$$

which is straightforward. $\square$

$$\sqrt[14]{\left(\sqrt{\frac{113+5\sqrt{505}}{8}}+\sqrt{\frac{105+5\sqrt{505}}{8}}\right)^3} = 1{,}65578\ldots$$

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.989117352243000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.989117352243000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.989117352243000/2}\right)}{1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.989117352243000}}{3\times 25}}}} =$$

$$1+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{(4\,\pi^2)\,e^{2\times 0.98911735224300000}}{3\times 25}}}} = 1+\frac{e^{0.49455867612150000}}{8} +$$

$$\frac{1}{8}\,e^{0.49455867612150000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.97823470448600000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

And from

$$\frac{h^2}{32} = \frac{e^{-4\phi}}{\left[1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right]^7}\left[42\left(1+\sqrt{1+\frac{\Lambda}{3}\,e^{2\phi}}\right)-13\,\Lambda\,e^{2\phi}\right].$$

we obtain:

e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))-13*(4Pi^2)/25*e^(2*0.989117352243)]

Input interpretation:

$$\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)$$

Result:

−0.034547055658…

-0.034547055658…

Series representations:

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right.\right.$$
$$\left.e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$
$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-\right.\right.\right.$$
$$25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\,e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right.$$

$$\left.e^{-4\times 0.9891173522430000}\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7=$$

$$-\left(\left(42\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\right.\right.\right.$$

$$\left.\left.\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\right.$$

$$e^{5.934704113458000}$$

$$\left.\left.\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

From which:

47 *1/(((-1/(((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))]))))))))

Input interpretation:

$$47\left(-\left(1\Big/1\Big/\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}\right)^7}\right.\right.\right.$$

$$\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}}-\right.\right.$$

$$\left.\left.\left.\left.\left.13\left(\frac{1}{25}(4\pi^2)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)\right)$$

Result:

1.6237116159...

1.6237116159…. result that is an approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}} - \frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974 \left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - 25\, e^{1.978234704486000} \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)\right) \Big/ \left(25\, e^{5.934704113458000} \left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right) \Big/ \left(25\,e^{5.934704113458000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)$$

$$-\left(47 \Big/ 1 \Big/ \left(e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right) \Big/ \left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right) =$$

$$\left(1974\left(-25\,e^{1.978234704486000}+52\,e^{3.956469408972000}\,\pi^2-25\,e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right) \Big/ \left(25\,e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

And again:

32((((e^(-4*0.989117352243) /
[1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 *
[42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-
13*(4Pi^2)/25*e^(2*0.989117352243))]))))

Input interpretation:

$$32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)$$

Result:

-1.1055057810...

-1.1055057810….

We note that the result -1.1055057810…. is very near to the value of Cosmological Constant, less 10^{-52} , thence 1.1056, with minus sign

Series representations:

$$\left(32\, e^{-4\times 0.9891173522430000} \left(42 \left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right. - \right.\right.$$
$$\left.\left.\left.\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right) \Big/$$
$$\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$
$$-\left(\left(1344\left(-25\, e^{1.978234704486000} + 52\, e^{3.956469408972000}\, \pi^2 - \right.\right.\right.$$
$$25\, e^{1.978234704486000} \sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}$$
$$\left.\left.\sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)\right) \Big/ \left(25\, e^{5.934704113458000}\right.$$
$$\left.\left.\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}} \sum_{k=0}^{\infty} \left(\frac{75}{4}\right)^k \left(e^{1.978234704486000}\, \pi^2\right)^{-k} \binom{\frac{1}{2}}{k}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000}+52\, e^{3.956469408972000}\,\pi^2-25\, e^{1.978234704486000}\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\right)\Big/\left(25\, e^{5.934704113458000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k \left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)$$

$$\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7 =$$

$$-\left(\left(1344\left(-25\, e^{1.978234704486000}+52\, e^{3.956469408972000}\,\pi^2-25\, e^{1.978234704486000}\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\right)\Big/\left(25\, e^{5.934704113458000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

And:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))]^5

Input interpretation:

$$-\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)^5$$

Result:

1.651220569...

1.651220569…. result very near to the 14th root of the following Ramanujan's class invariant $Q = \left(G_{505}/G_{101/5}\right)^3 = 1164.2696$ i.e. 1.65578...

Series representations:

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\,\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^{35}\right)$$

$$-\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\,\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\,\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)^5 =$$

$$\left(4\,385\,270\,057\,140\,224\left(-25+52\, e^{1.978234704486000}\,\pi^2-25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^5\right)\Big/$$

$$\left(9\,765\,625\, e^{19.78234704486000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^{35}\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

We obtain also:

-[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))-13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}$$

Result:

-0

$1.0514303501\ldots i$

Polar coordinates:

$r = 1.05143035007$ (radius), $\theta = -90°$ (angle)

1.05143035007

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)} = -\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\, \pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\, \pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\, \pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)}$$

Series representations:

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)} = -\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\, \pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\, \pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\, \pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\, \pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=-\frac{8}{5}\sqrt{21}$$

$$\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}$$

$$-\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}=$$

$$-\frac{8}{5}\sqrt{21}\sqrt{\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\, e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)}$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \leq 0$))

1 / -[32((((e^(-4*0.989117352243) / [1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))]^7 * [42(1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243))))- 13*(4Pi^2)/25*e^(2*0.989117352243))])))]^1/2

Input interpretation:

$$-\left(1\Bigg/\left(\sqrt{\left(32\left(\frac{e^{-4\times 0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}\right)^7}\left(42\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}}-13\left(\frac{1}{25}\left(4\pi^2\right)\right)e^{2\times 0.989117352243}\right)\right)\right)\right)}\right)\right)$$

Result:

$0.95108534763\ldots\, i$

Polar coordinates:

$r = 0.95108534763$ (radius), $\theta = 90°$ (angle)

0.95108534763

We know that the primordial fluctuations are consistent with Gaussian purely adiabatic scalar perturbations characterized by a power spectrum with a spectral index $n_s = 0.965 \pm 0.004$, consistent with the predictions of slow-roll, single-field, inflation.

Thence 0.95108534763 is a result very near to the spectral index n_s, to the mesonic Regge slope, to the inflaton value at the end of the inflation 0.9402 and to the value of the following Rogers-Ramanujan continued fraction:

$$\frac{e^{-\frac{\pi}{5}}}{\sqrt{(\varphi-1)\sqrt{5}}-\varphi+1}=1-\cfrac{e^{-\pi}}{1+\cfrac{e^{-2\pi}}{1+\cfrac{e^{-3\pi}}{1+\cfrac{e^{-4\pi}}{1+\ldots}}}}\approx 0.9568666373$$

Series representations:

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\, e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\, 13\, e^{2\times 0.9891173522430000}\right)\right)\right)\Bigg/\left(1+\sqrt{1+\frac{(4\pi^2)\, e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Bigg/\left(8\sqrt{21}\sqrt{\left(\left(\left(25-52\, e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)\Bigg/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\, e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}\right)^7\right)\right)\right)}\right)\right)$$

$$-\left(1\Big/\left(\sqrt{\left(\left(32\,e^{-4\times 0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}-\frac{1}{25}(4\pi^2)\,13\,e^{2\times 0.9891173522430000}\right)\right)\right)\Big/\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times 0.9891173522430000}}{3\times 25}}\right)^7\right)}\right)\right)=$$

$$-\left(5\Big/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)\Big/\left(e^{3.956469408972000}\left(1+\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}\right)^7\right)\right)}\right)\right)$$

$$-\left(1\Bigg/\left(\sqrt{\left(\left(32\,e^{-4\times0.9891173522430000}\left(42\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times0.9891173522430000}}{3\times25}}-\frac{1}{25}\right.\right.\right.\right.}\right.\right.$$

$$\left.\left.\left.(4\pi^2)\,13\,e^{2\times0.9891173522430000}\right)\right)\right)\Bigg/$$

$$\left.\left.\left.\left(1+\sqrt{1+\frac{(4\pi^2)\,e^{2\times0.9891173522430000}}{3\times25}}\right)^7\right)\right)\right)=$$

$$-\left(5\Bigg/\left(8\sqrt{21}\sqrt{\left(\left(25-52\,e^{1.978234704486000}\,\pi^2+25\sqrt{z_0}\right.\right.}\right.\right.$$

$$\left.\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)\Bigg/$$

$$\left(e^{3.956469408972000}\right.$$

$$\left(1+\sqrt{z_0}\sum_{k=0}^{\infty}\right.$$

$$\left.\left.\left.\left.\left.\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}\right)^7\right)\right)\right)\right)$$

for (not ($z_0 \in \mathbb{R}$ and $-\infty < z_0 \le 0$))

From the previous expression

$$\frac{\dfrac{e^{-4\times0.989117352243}}{\left(1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}(4\pi^2)\right)e^{2\times0.989117352243}}\right)^7}}{\left(42\left(1+\sqrt{1+\dfrac{1}{3}\left(\dfrac{1}{25}(4\pi^2)\right)e^{2\times0.989117352243}}-13\left(\dfrac{1}{25}(4\pi^2)\right)e^{2\times0.989117352243}\right)\right)}$$

= -0.034547055658…

we have also:

1+1/(((4((2*e^(-0.989117352243/2))) / ((((1+sqrt(((1+1/3*(4Pi^2)/25*e^(2*0.989117352243)))))))))) + (-0.034547055658)

Input interpretation:

$$1+\frac{1}{4\times\frac{2\,e^{-0.989117352243/2}}{1+\sqrt{1+\frac{1}{3}\left(\frac{1}{25}\left(4\,\pi^2\right)\right)e^{2\times0.989117352243}}}}-0.034547055658$$

Result:

1.61976215705...

1.61976215705….. result that is a very good approximation to the value of the golden ratio 1.618033988749...

Series representations:

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times0.98911735224300000}}{3\times25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\left(\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\binom{\frac{1}{2}}{k}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.98911735224300000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times0.98911735224300000}}{3\times25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+\frac{1}{8}\,e^{0.4945586761215000}\sqrt{\frac{4\,e^{1.978234704486000}\,\pi^2}{75}}\sum_{k=0}^{\infty}\frac{\left(-\frac{75}{4}\right)^k\left(e^{1.978234704486000}\,\pi^2\right)^{-k}\left(-\frac{1}{2}\right)_k}{k!}$$

$$1+\frac{1}{\frac{4\left(2\,e^{-0.9891173522430000/2}\right)}{1+\sqrt{1+\frac{\left(4\,\pi^2\right)e^{2\times 0.9891173522430000}}{3\times 25}}}}-0.0345470556580000=$$

$$0.9654529443420000+\frac{e^{0.4945586761215000}}{8}+$$

$$\frac{1}{8}\,e^{0.4945586761215000}\,\sqrt{z_0}\,\sum_{k=0}^{\infty}\frac{(-1)^k\left(-\frac{1}{2}\right)_k\left(1+\frac{4\,e^{1.978234704486000}\,\pi^2}{75}-z_0\right)^k z_0^{-k}}{k!}$$

$$\text{for } (\text{not } (z_0\in\mathbb{R} \text{ and } -\infty<z_0\leq 0))$$

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References

Differential and Numerically Invariant Signature Curves Applied to Object Recognition – *Eugenio Calabi, P. J. Oliver et al.* – May 1, 1996

Branes, Calabi–Yau Spaces, and Toroidal Compactification of the N=1 Six Dimensional E_8 Theory - *Ori J. Ganor, David R. Morrison and Nathan Seiberg* - https://arxiv.org/abs/hep-th/9610251v2

Modular equations and approximations to π - *Srinivasa Ramanujan*
Quarterly Journal of Mathematics, XLV, 1914, 350 – 372

An Update on Brane Supersymmetry Breaking
J. Mourad and A. Sagnotti - arXiv:1711.11494v1 [hep-th] 30 Nov 2017

March 27, 2018
AdS Vacua from Dilaton Tadpoles and Form Fluxes
J. Mourad and A. Sagnotti - arXiv:1612.08566v2 [hep-th] 22 Feb 2017